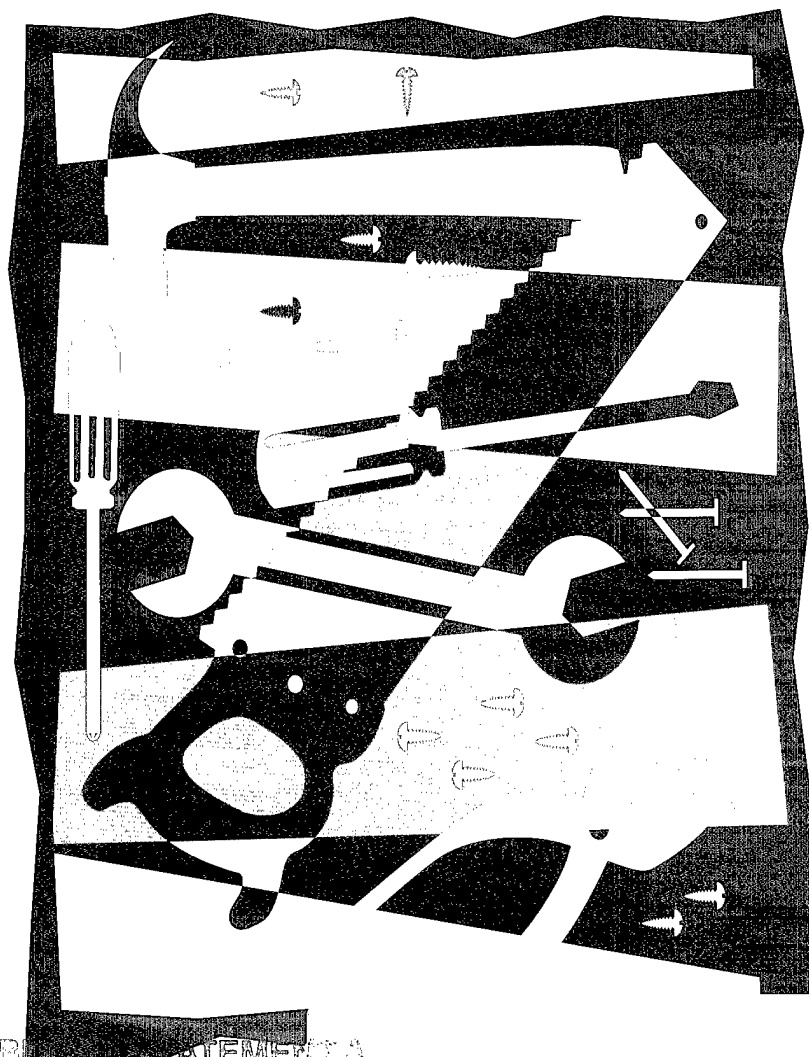


DSMC  
PROGRAM  
MANAGERS  
TOOL KIT



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# **DSMC PROGRAM MANAGERS TOOL KIT**

Ninth Edition  
March 1999



**DTIC QUALITY INSPECTED 4**

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DSMC PROGRAM MANAGERS TOOL KIT



## DSMC PROGRAM MANAGERS TOOL KIT

### PREFACE

This 9th Edition of the "Tool Kit" contains a graphic summary of acquisition policies and managerial skills frequently required by DoD program managers. It is an updated version of a "Tool Box" that was first developed by Mr. Charles F. Schied of PMC 92-1. For convenience, it is sized for insertion into a 3-hole, 5-1/2" x 8-1/2" "Day Runner." The information was extracted from material presented by the Defense Systems Management College (DSMC) in the Intermediate Systems Acquisition Course (ISAC) and Advanced Program Management Course (APMC). It reflects Change 3 to DoD 5000.2-R. Material from the DSMC Learning Resource Center was also used.

Users of the "Tool Kit" are reminded that this summary is a guide only and should not be used as a substitute for official policy guidance. Periodic review of official policy guidance is recommended.

## ACKNOWLEDGMENTS

As Sponsor of this "Tool Kit" Project, I wish to recognize the following members of the DSMC faculty and staff for their input to this 9th Edition: Mr. Bill Bahnmaier, who coordinated the input and editing of material from various departments; Ms. Johnnie Kennedy of the Principles of Program Management Department for typing, formatting and editing support; Mr. Chuck Cochrane of the Acquisition Policy Department for his significant input and editing support; Mr. Eduard Boyd of the Visual Arts Department for his support in preparing and editing drafts for printing; Mr. Frank Scavotto and Mr. Mike King, of the Defense Automated Printing Service (DAPS) for their excellent printing support. Other significant contributors were Commander John Kelley, PML Department; Mr. Frank Meneely, CM Department; Mr. Paul Alfieri, TE Department; Dr. John Snoderly and Mr. Randy Zittel, SE Department; Dr. Ben Rush, CF Department; Mr. Walt Weedman, formerly of the EV Department; Mr. John Riffie, LS Department; Mr. Gerry Land and Ms. Siobhan Tack, FM Department; Lt Col Dave Schmitz, MM Department; and Mr. Richard Kwatnoski of the Executive and International Course Department. I also want to thank Mr. Richard Reed, Provost, who provided both encouragement and command support for the project.



John T. Shannon  
Dean Faculty Division

## DSMC PROGRAM MANAGERS TOOL KIT

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## **/** **ACQUISITION MANAGEMENT**

- Things that make you go “Hmmm?...”

“The only thing most auditors fix is the blame.”

“Experience is something you got just after you needed it.”

“People are smarter than they look; listen to them.”

“The last 10 percent of the performance sought generates one-third of the cost and two-thirds of the problems.”

“Never open a can of worms unless you want to go fishing.”

“Those who believe it cannot be done will please get out of the way of those who are busy doing it.”

- Things we should always remember.

“Be honest in everything you say, write and do.”

“Be good to your people, and they will be good to you.”

“Forgiveness is easier to obtain than permission.”

“Keep everyone informed; when in doubt, coordinate.”

“Be the first to deliver bad news.”

“If you are sitting at your desk, you are not managing your program.”



## **THE PROGRAM MANAGER'S BILL OF RIGHTS AND RESPONSIBILITIES**

### ***RIGHTS:***

Program Managers have the RIGHT to:

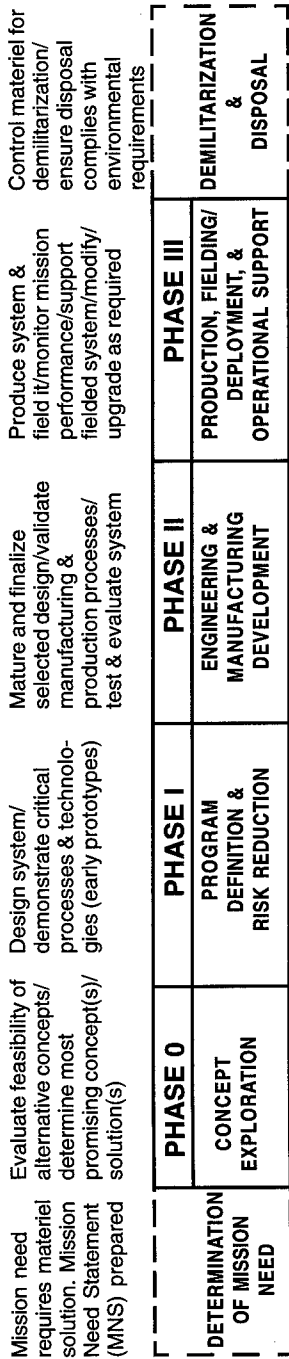
- A single, clear line of authority from the Defense Acquisition Executive.
- Authority commensurate with their responsibilities.
- Timely decisions by senior leadership.
- Be candid and forthcoming without fear of personal consequences.
- Speak for their program and have their judgments respected.
- The best available training and experience for the job.
- Adequate financial and personnel resources.

### ***RESPONSIBILITIES:***

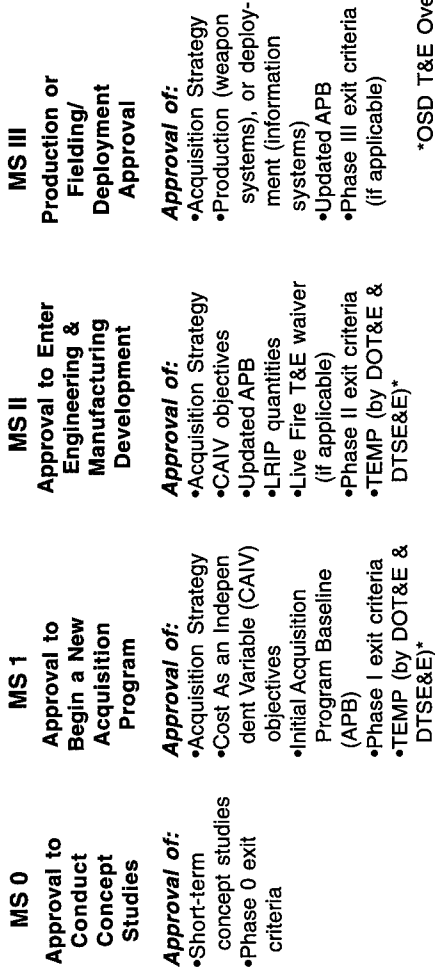
Program Managers have the RESPONSIBILITY to:

- Accept program direction from acquisition executives and implement it expeditiously and conscientiously.
- Manage their programs to the best of their abilities within approved resources.
- Be customer focused and provide the user with the best, most cost-effective systems or capabilities.
- Innovate, strive for optimal solutions, seek better ways to manage, and provide lessons-learned to those who follow.
- Be candid about program status, including risks and problems as well as potential solutions and likely outcomes.
- Prepare thorough estimates of financial and personnel resources that will be required to manage the program.
- Identify weaknesses in the acquisition process and propose solutions.

## Defense Acquisition Milestones & Phases



3



\*OSD T&E Oversight Programs only

DSMC PROGRAM MANAGERS TOOL KIT

## ACQUISITION CATEGORIES (ACAT)

<b>Major Defense Acq Pgms</b>	<b>ACAT 1D:</b>	<ul style="list-style-type: none"> <li>• DAB Review</li> <li>• Designated by DAE</li> <li>• Decision by DAE</li> </ul>	<div>\$355M RDT&amp;E or \$2.135B Procurement (FY96 Constant \$)</div>
	<b>ACAT 1C:</b>	<ul style="list-style-type: none"> <li>• Component Review</li> <li>• Designated by DAE</li> <li>• Decision by Svc Sec/CAE</li> </ul>	
<b>Major AIS Acq Pgms</b>	<b>ACAT 1AM:</b>	<ul style="list-style-type: none"> <li>• MAISRC Review</li> <li>• Designated by ASD(C3I)</li> <li>• Decision by ASD(C3I)</li> </ul>	<div>\$360M Life Cycle Cost or \$120M Total Prog. Cost or \$30M Prog. Cost in any single year (FY96 Constant \$)</div>
	<b>ACAT 1AC:</b>	<ul style="list-style-type: none"> <li>• Component Review</li> <li>• Designated by ASD(C3I)</li> <li>• Decision made by Comp. Chief Information Officer</li> </ul>	
<b>Major Systems</b>	<b>ACAT II:*</b>	<ul style="list-style-type: none"> <li>• Does Not Meet ACAT I Criteria</li> <li>• Designated by Svc Sec/CAE</li> <li>• Decision by Svc Sec/CAE</li> </ul>	<div>\$140M RDT&amp;E or \$645M Procurement (FY96 Constant \$)</div>
<b>all others (except for Army Navy, USMC)</b>	<b>ACAT III:</b>	<ul style="list-style-type: none"> <li>• Does Not Meet ACAT I, IA or II Criteria</li> <li>• Designated IAW Component policy</li> <li>• Decision at lowest appropriate Level</li> </ul>	<div>No Fiscal Criteria</div>
<b>Army Navy USMC</b>	<b>ACAT IV:</b>	<ul style="list-style-type: none"> <li>• Not otherwise designated ACAT I, IA, II or III</li> <li>• Designated IAW Component Policy</li> <li>• Navy/USMC ACAT IVT/IVM</li> <li>• Decision at lowest appropriate level</li> </ul>	<div>See AR 70-1 (Army) &amp; SECNAVINST 5000.2B (Navy and Marine Corps)</div>

\*Army has an ACAT IIA category for AIS reviewed at Army CIO level

DSMC PROGRAM MANAGERS TOOL KIT

**ACQUISITION STRATEGY ELEMENTS  
(ACAT I & IA PROGRAMS)  
(See Part 3.3, DoD 5000.2-R)**

- Open Systems Objectives
- Sources
  - Commercial & NDI
  - Dual Use Technologies & Use of Commercial Plants
  - Critical Product & Technology Competition
  - Industrial Capability
  - Leasing (10 USC 2401a)
- Cost, Schedule, and Performance Risk Management
- Cost As an Independent Variable
  - Cost Performance Trade-offs
  - Cost Management Incentives
- Contract Approach
  - Competition
  - CALS Integrated Data Environment
  - Best Practices
  - Advance Procurement \*
  - Integrated Baseline Reviews
- Management Approach
  - Streamlining
  - Information Sharing & Oversight
  - International Cooperation (10 USC 2350) \*
  - Assignment of PEO
  - Use of DCMC Tech. Support
  - Joint Program Management
- Environmental, Safety, & Health Evaluation (42 USC 4321-47)
- Modeling & Simulation Approach \*\*
- Source of Support
- Warranties \*
- Government Property in the Possession of Contractors \*\*

\* normally not applicable to AIS programs

\*\* new elements in proposed change 4 to DoD 5000.2-R

## **ACQUISITION REFORM INITIATIVES**

- Integrated Product and Process Development and Integrated Product Teams
- Movement from Detailed Design Specifications and Process Standards to Performance and/or Commercial Specifications
- Single Process Initiative
- DoD Cost/Schedule Control System Criteria Replaced by Industry Standard Guidelines for Earned Value Management System (EVMS)
- Commercial and Non-Developmental Item Acquisition and Practices
- Cost As an Independent Variable (CAIV)
- Open Systems Design and Interoperability
- Rewrite of DoDD 5000.1 and DoD 5000.2-R to streamline policies and procedures
- Defense Acquisition Deskbook
- Defense Acquisition Pilot Programs
- Implementation of Federal Acquisition Streamlining Act (FASA), Federal Acquisition Reform Act (FARA) and Information Technology Management Reform Act (ITMRA);  
(latter two are now known as Clinger-Cohen Act)
- Electronic Commerce/Electronic Data Interchange
- Collection and Use of Past Performance Information
- Advanced Concept Technology Demonstrations (ACTD)
- Acquisition Reform Benchmarking Initiative
- Acquisition Workforce Personnel Demonstration Program
- Contract Administration Reform
- Procurement Process Reform
- Performance Based Service Contracting
- Defense Reinvention Impact Center (RIC) -- Goals by Year 2000
- Total Ownership Costs (TOC)

## DSMC PROGRAM MANAGERS TOOL KIT

### PLANNING TO SUPPORT ACQUISITION PROCESS

- Planning to support the acquisition process is accomplished within the Integrated Product and Process Development (IPPD) environment.
- Program plans are for use by the PM and the integrated product teams (IPTs) that support the PM and are discretionary.
- There are three exceptions where specific plans are required:  
Acquisition Plan required by the FAR/DFARS; Command, Control Communications, Computers and Intelligence, (C4I) Support Plan and TEMP -- the latter two are required by DoD 5000.2-R.
- Typically, the following areas will require some level of program office planning:

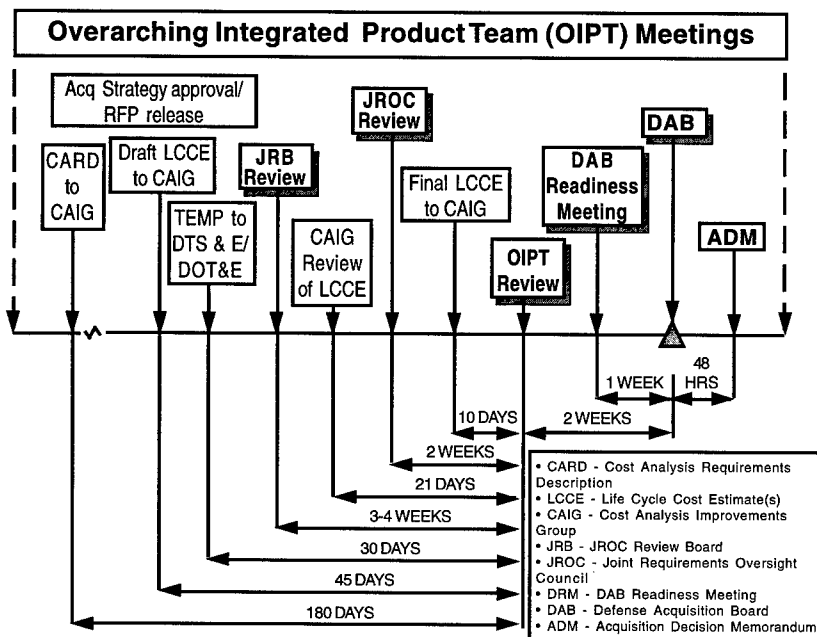
- Acquisition Strategy (page 5)	- Risk Management
- Systems Engineering	- Computer/Software Devel/PDSS
- Logistics Support/Post Prod Spt	- Human Systems Integration
- Program Protection	- Deployment/Fielding
- Training Development	- Manufacturing
- Technology Assessment & Control	- Integrated Testing

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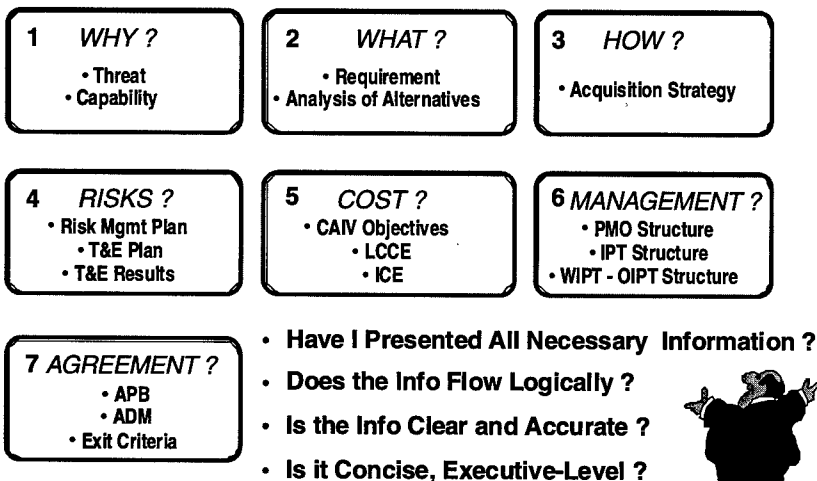
### The Defense Acquisition Deskbook

## DSMC PROGRAM MANAGERS TOOL KIT

### DAB Timeline (Milestones I-III)



### Milestone Decision Information — A Possible Construct



# DSMC PROGRAM MANAGERS TOOL KIT

## Information for Milestone Reviews ACAT I and ACAT IA Programs

Information	Milestone				Reference	
	0	I	II	III	DoD 5000.2-R	Other
NOTE: MDA may waive non-statutory requirements						
Acquisition Program Baseline (APB) <sup>1</sup>		X	X	X	Part 3.2.2	10 USC 2435
Acquisition Strategy (11 elements - see page 5)		X	X	X	Part 3.3	
Analysis of Alternatives (AOA) <sup>2</sup>	X	X	<sup>2</sup>	<sup>2</sup>	Part 2.4	
Acquisition Decision Memorandum (ADM)	X	X	X	X	Part 5.2.1	
Affordability Assessment		X	X	X	Part 2.5.2	DoDD 5000.1
Beyond Low Rate Initial Production (LRIP) Report <sup>3</sup>				X	Part 6.3.3	10 U SC 2399
Component Cost Analysis (CCA)		X	X	X	Part 5.6	DoDD 5000.4
Consideration of Technological Issues	X	X	X	X	Part 1.4	
Cost Analysis Requirements Description (CARD)		X	X	X	Part 3.5.1	DoDD 5000.4
Exit Criteria	X	X	X	X	Part 3.2.3	
Full Funding of Dab & MAISRC Programs		X	X	X	Part 2.5.1	
Independent Estimate of Life Cycle Cost		X	X	X	Part 3.5.1	10 USC 2434
Interoperability Certification (C3I Systems)				X		DoDI 4630.8
Live Fire Test & Evaluation Waiver Certification <sup>3</sup>				X	Part 3.4.9	10 USC 2366
Live Fire Test & Evaluation (LFT&E) Report <sup>3</sup>				X	Part 6.3.2	10 USC 2366
Legality of Weapons Under International Law			X	X		DoDD 5000.1
Legality of Weapons Under International Law				X	Part 1.4.4.	10 USC 2400
Manpower Estimate <sup>3</sup>			X	X	Part 3.5.2	10 USC 2434
Mission Need Statement (MNS)	X				Part 2.3	CJCSI 3170.01
Operational Requirements Document (ORD)		X	X	X	Part 2.3	CJCSI 3170.01
Overarching IPT (OIPT) Leader's Report <sup>4</sup>	X	X	X	X	Part 5.4.1	
OIPT Staff Assessments <sup>4</sup>	X	X	X	X	Part 5.4.1	
Program Office Estimate (POE) (life cycle costs)		X	X	X	Part 3.5.1	DoDD 5000.4
Provisions for Evaluation of Post Deployment Support		X	X	X	Part 1.5.4	
Requirement for Program Under DoD Strategic Plan	X	X	X	X	Part 1.5	
Test & Evaluation Master Plan (TEMP)		X	X	X	Part 2.2	
Test Results (DT&E, OT&E, LFT&E, etc.)		X	X	X	Part 3.4.11	10 USC 2399
System Threat Assessment <sup>3</sup>			X	X	Part 6.3.1	10 USC 139

<sup>1</sup> Including CAIV based objectives.

<sup>2</sup> MS 0 for ACAT IA; MS I for ACAT I. May be useful if updated for MS II; unlikely to be required at Milestone III).

<sup>3</sup> Normally not applicable to ACAT IA.

<sup>4</sup> ACAT ID and ACAT IAM programs only.



DSMC PROGRAM MANAGERS TOOL KIT

**Information For Milestone Reviews  
ACAT II and III\* Programs**

Information Element NOTE: MDA may waive non-statutory requirements	Milestone				Reference	
	0	I	II	III	Primary	Other/Related
Acquisition Program Baseline (APB) <sup>1</sup>		X	X	X	DoDD 5000. 1, D. 3. g	DoD 5000. 2-R, 3.2.2
Acquisition Strategy		X	X	X	DoD 5000. 2-R, 3. 3	
Affordability		X	X	X	DoDD 5000. 1, D, 1. a	DoD 5000. 2-R, 2.
Environmental Safety & Health (ESH) Assessment <sup>2</sup>		X	X	X	DoD 5000. 2-R, 3. 3. 7	42 USC 4321-47
Interoperability Certification (C3I Systems)				X	DoDI 4630. 8	
Legality of Weapons Under International Law			X	X	DoDD 5000. 1, D. 2. j	
Life Cycle Cost Estimate		X	X	X	DoDD 5000. 1, D. 1. g	DoD 5000. 2-R, 3.5.1
Live Fire Test & Evaluation Waiver Certification <sup>3,4</sup>			X		DoD 5000. 2-R, 3. 4. 9	10 USC 2366
Live Fire Test & Evaluation Report <sup>3,4</sup>				X	DoD 5000. 2-R, 6. 3. 2	10 USC 2366
Low Rate Initial Production (LRIP) Quantities <sup>2,3,5</sup>			X		DoD 5000. 2-R, 1. 4. 4. 1	
Mission Need Statement (MNS)	X				CJCSI 3170. 01	DoD 5000. 2-R, 2.3
Operational Requirements Document (ORD)		X	X	X	CJCSI 3170. 01	DoD 5000. 2-R, 2.3
Risk Assessment <sup>2</sup>		X	X	X	DoDD 5000. 1, D. 1. d	
Staff Assessments	X	X	X	X	DoDD 5000. 1, D. 2. g	
Test & Evaluation Master Plan (TEMP) <sup>6</sup>		X	X	X	DoD 5000. 2-R, 3. 4. 11	10 USC 2399
Test Results (DT/ OT/ LFT&E) <sup>6</sup>			X	X	DoD 5000. 2-R, 6. 3. 1	10 USC 139

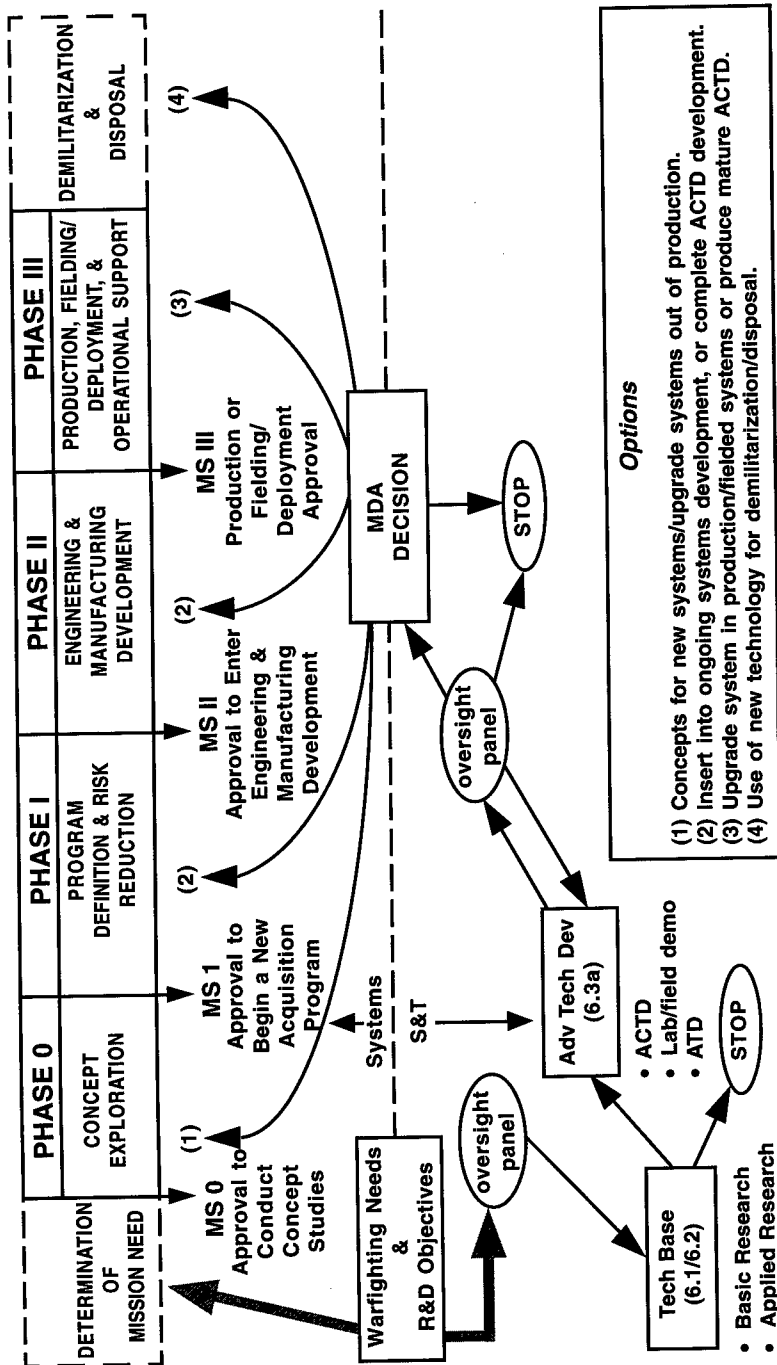
**MDA's for ACAT II & III\* programs have wide latitude and broad authority over the content and format of many (but not all) of these information elements**

Notes:

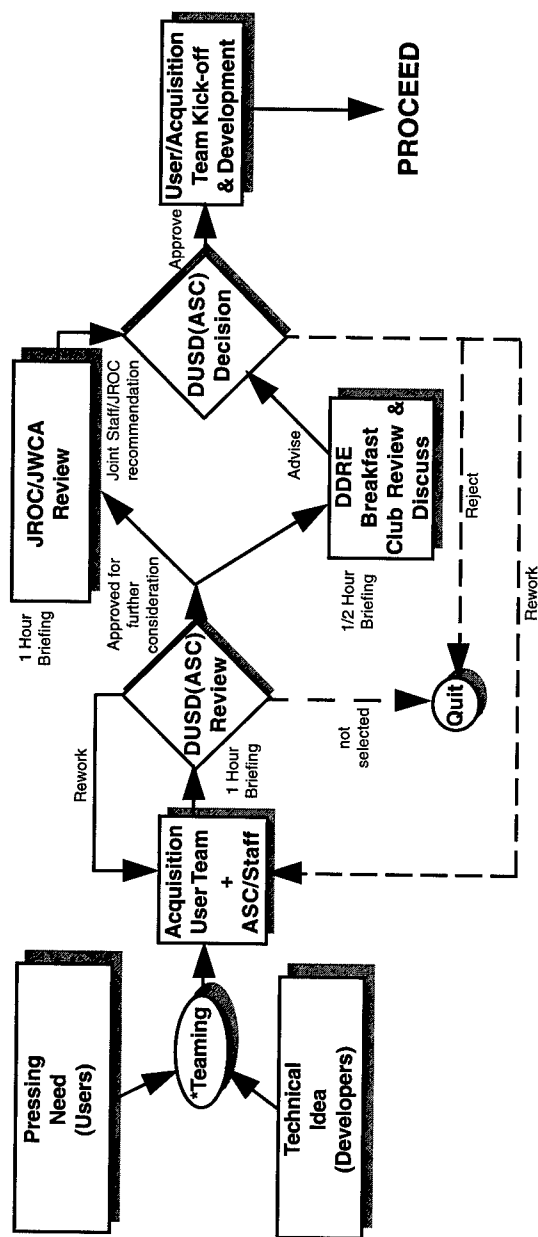
1. Including Cost as An Independent Variable (CAIV) based objectives.
2. May be included in PM's acquisition strategy.
3. Normally not required for AIS programs.
4. Programs subject to live fire T&E legislation.
5. ACAT II only; how ever, it is DoD Policy to limit LRIP quantities for all ACATs.
6. Programs on OSD T&E Oversight List.

*\*Army, Navy and Marine Corps also have an ACAT IV category. The information on this chart may also be tailored for those programs.*

# S&T LINKAGE TO DEFENSE ACQUISITION PROCESS



# ACTD INITIATION PROCESS



\*Advanced Systems Concepts staff will assist, if necessary, to arrange user/developer team

## ACQUISITION PROGRAM VS. ATD & ACTD

	Acquisition Program	Advanced Technology Demonstration (ADT)	Advanced Concept Tech Demonstration (ACTD)
<b>Motivation</b>	<ul style="list-style-type: none"> <li>Develop, produce and field system</li> <li>Cost, schedule, performance</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate feasibility and maturity</li> <li>Reduce technical risks and uncertainties at relatively low cost</li> </ul>	<ul style="list-style-type: none"> <li>Gain understanding of and evaluate utility prior to acquisition decision</li> <li>Develop concepts of operation and doctrine</li> </ul>
<b>Requirement</b>	MNS/ORD	not required	not required
<b>Oversight</b>	milestone decision authority	labs/R&D centers	DUSD(ASC) Oversight Panel
<b>Funding</b>	fully FYDP funded	RDT&E	RDT&E (2yrs in field)
<b>ACAT</b>	I, II, III	not ACAT effort	not ACAT effort
<b>Configuration &amp; Testing</b>	system/subsystem prototypes DT/OT	technology demonstrations	tech demonstrations in field environment with users ACTD
<b>Rules</b>	DoD 5000series/FAR	informal/FAR	Mgmt Plan/FAR
<b>Role of User</b>	max involvement	some involvement	max involvement

FAR: Federal Acquisition Regulation

MNS: Mission Need Statement

ORD: Operational Requirements Document

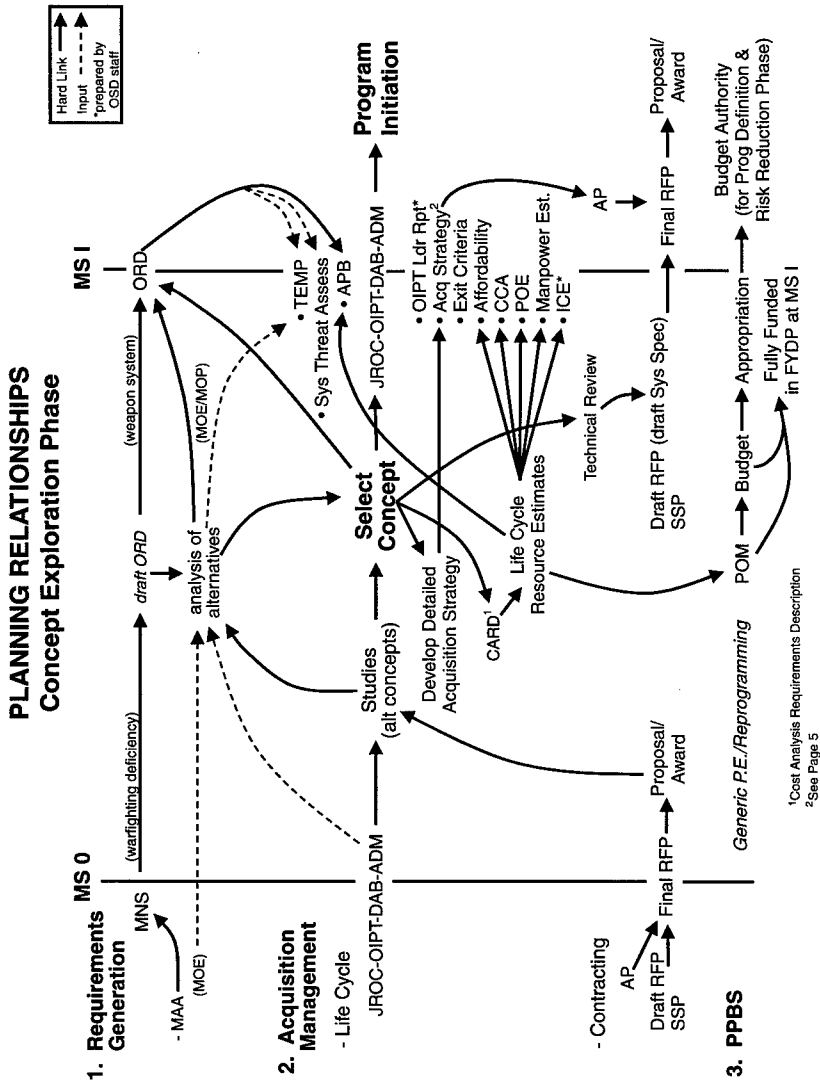
DUSD(AT): Deputy Under Sec Def (Advanced Technology)

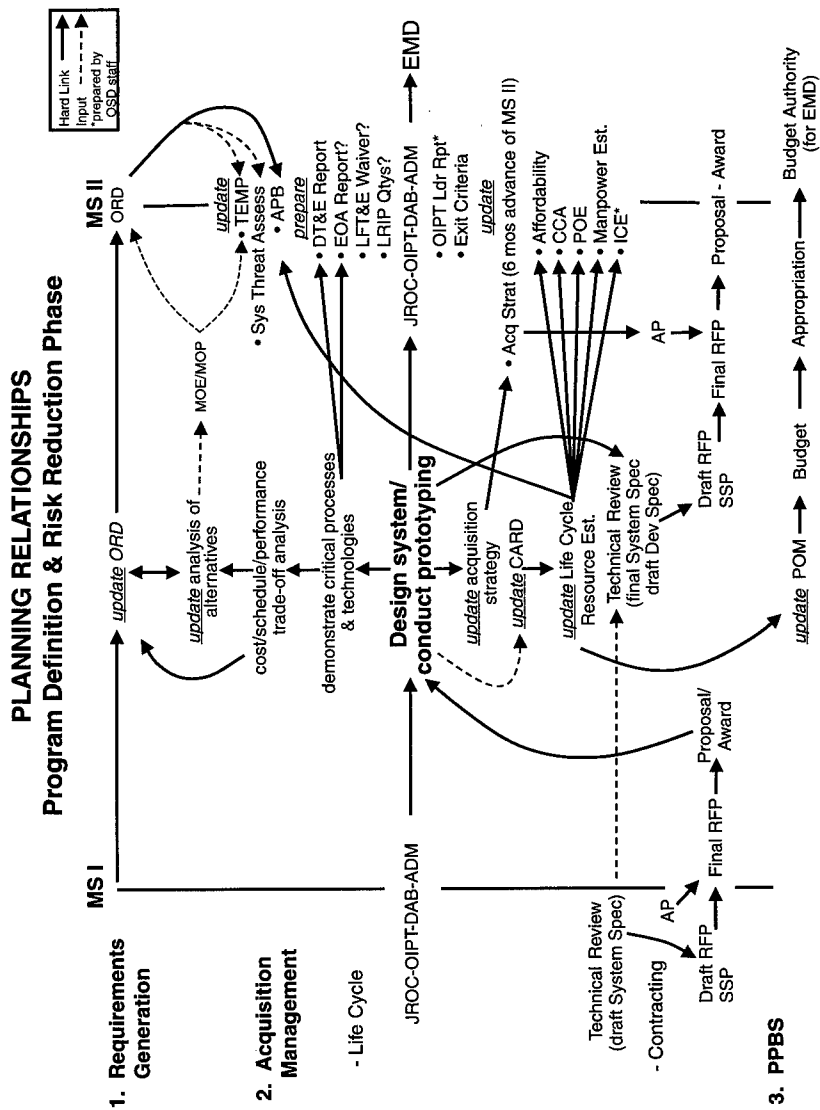
FYDP: Future Years Defense Program

RDT&E: Research, Dev, Test & Eval (appropriation)

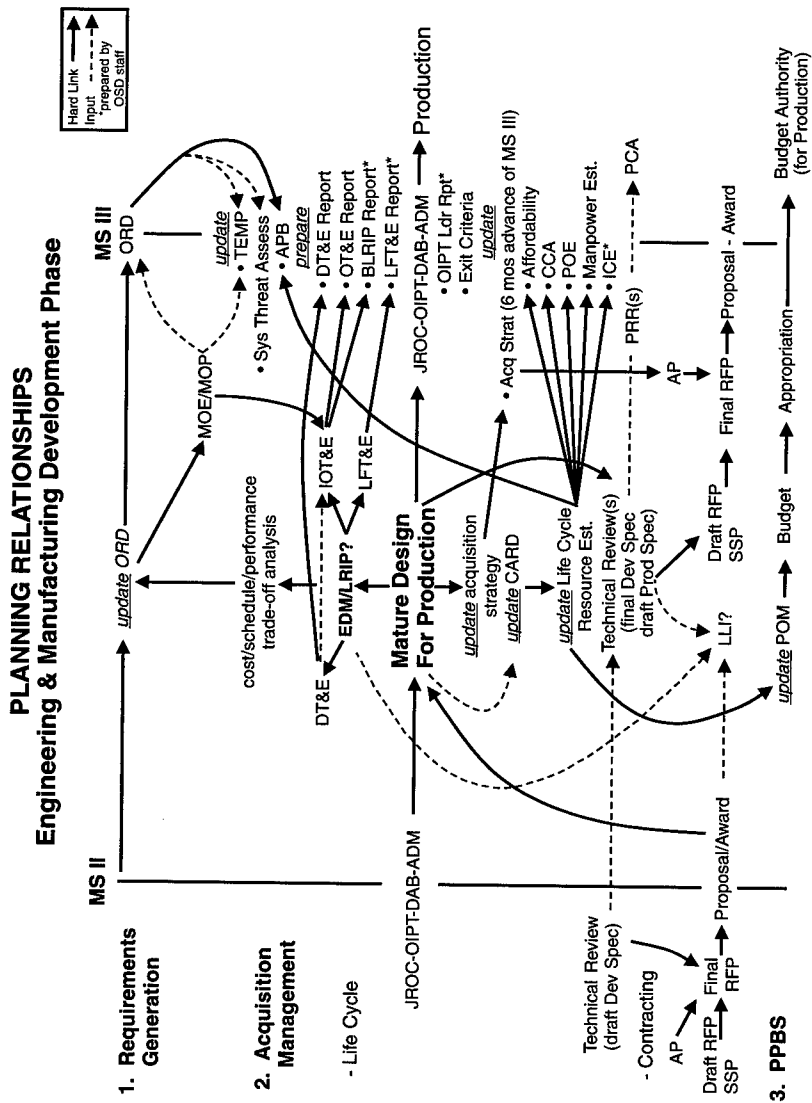
ACAT: Acquisition Category

DT/OT: Developmental/Operational Testing

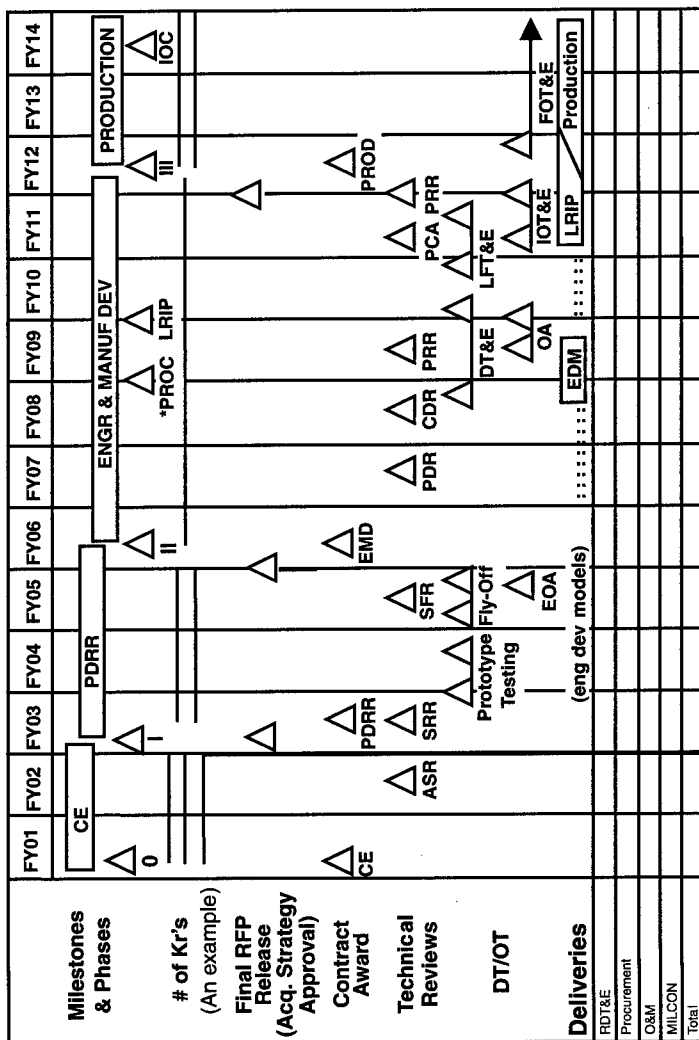




# DSMC PROGRAM MANAGERS TOOL KIT



PROGRAM STRUCTURE/SCHEDULE (EXAMPLE)

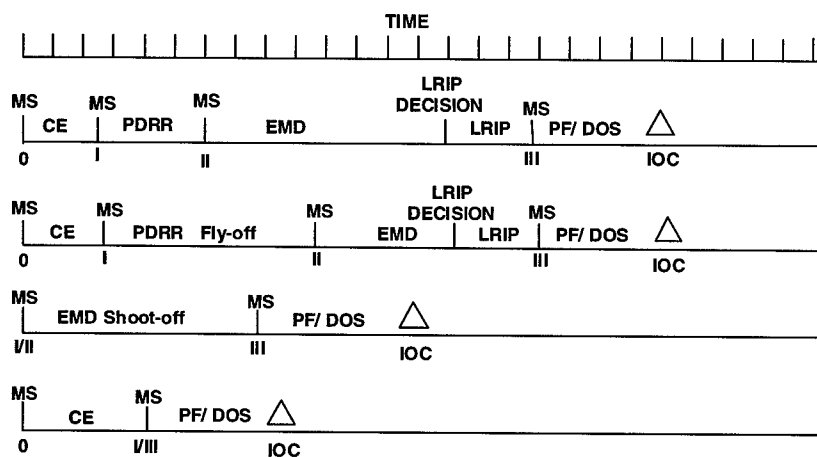


\*MDA usually approves advance procurement for LRIP.



## DSMC PROGRAM MANAGERS TOOL KIT

### TAILORED PROGRAM STRUCTURES



## DoD INTERNATIONAL ARMAMENTS COOPERATION POLICY

**SECDEF Memorandum 23 March 1997**

"It is DoD policy that we utilize International Armaments Cooperation to the maximum extent feasible, consistent with sound business practice and with overall political, economic, technological, and national security goals of the United States."

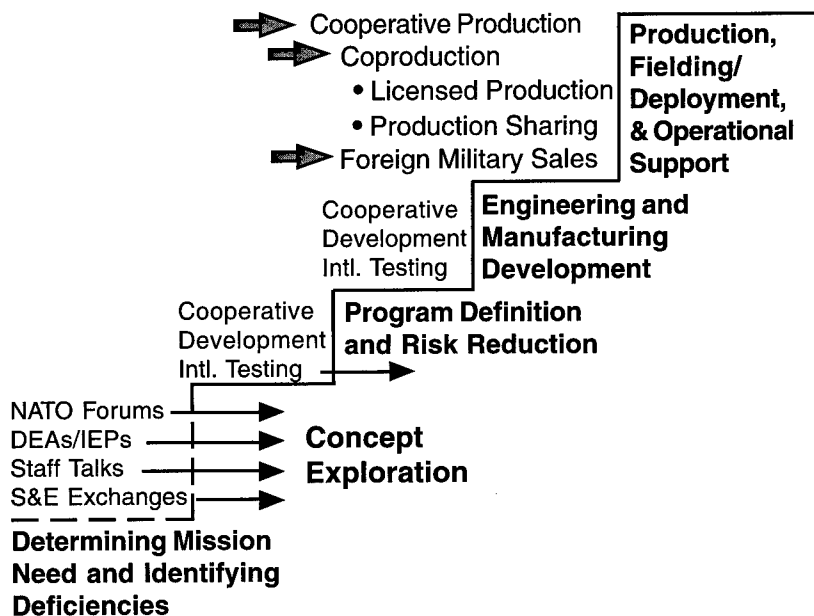
## DSMC PROGRAM MANAGERS TOOL KIT

### DEFENSE SALES VS. COOPERATIVE ACQUISITION

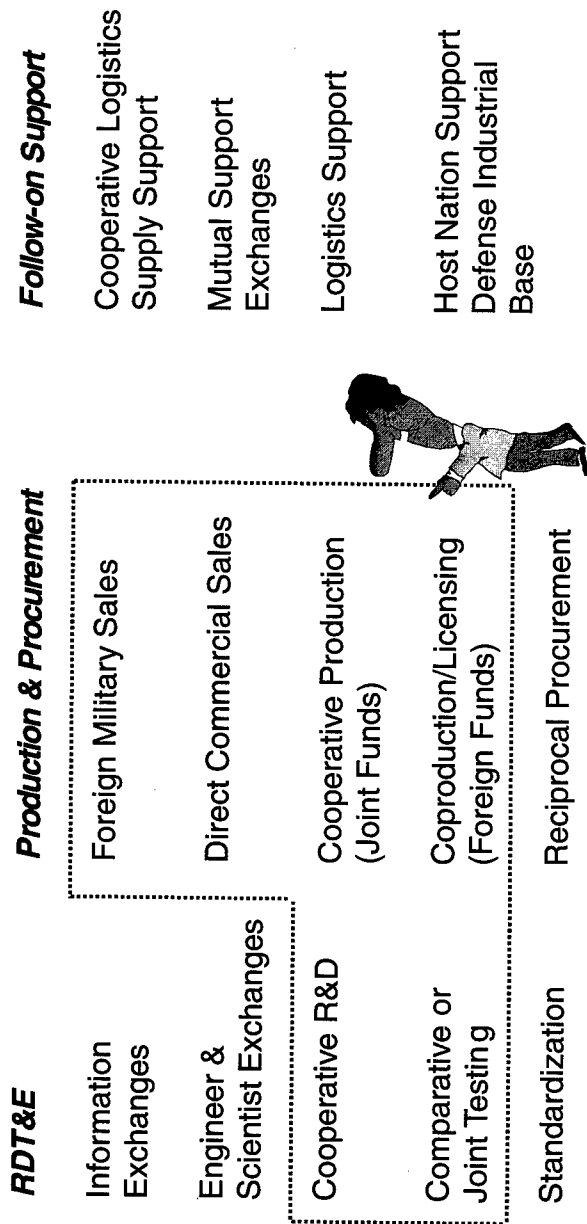
#### *They are Different*

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Defense Sales             <ul style="list-style-type: none"> <li>• Any nation</li> <li>• U.S. Contracts (FMS)</li> <li>• U.S. Manages</li> <li>• Production &amp; Support</li> <li>• DoS or DoC</li> <li>• + DoD - USD (Policy)</li> <li>• Foreign Initiated</li> <li>• Foreign Funds (or U.S. Credit/Grants)</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Cooperative Acquisition             <ul style="list-style-type: none"> <li>• Allied or Friendly</li> <li>• U.S., Ally or NATO</li> <li>• Jointly Managed</li> <li>• All Acquisition</li> <li>• DoD - USD (A&amp;T)</li> <li>• + DoS and DoC</li> <li>• U.S. and/or Foreign</li> <li>• U.S. + Foreign Funds</li> </ul> </li> </ul> |
|---|--|

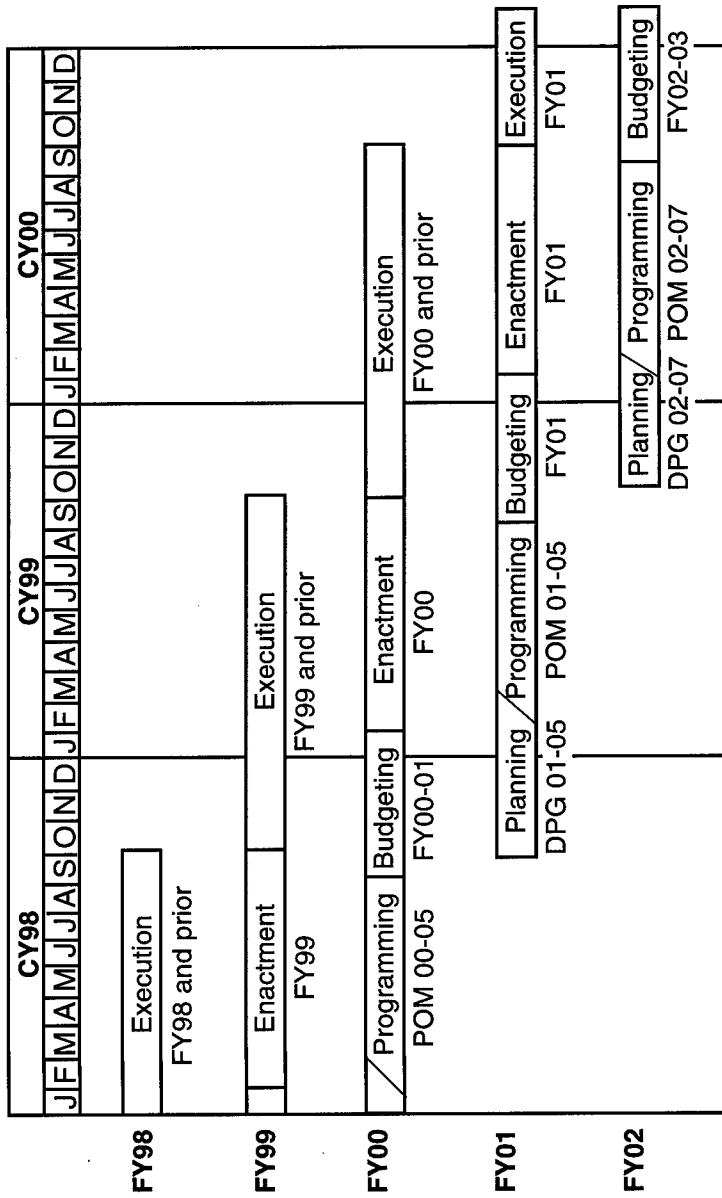
### INTERNATIONAL ACTIVITIES ASSOCIATED WITH DEFENSE ACQUISITION PHASES

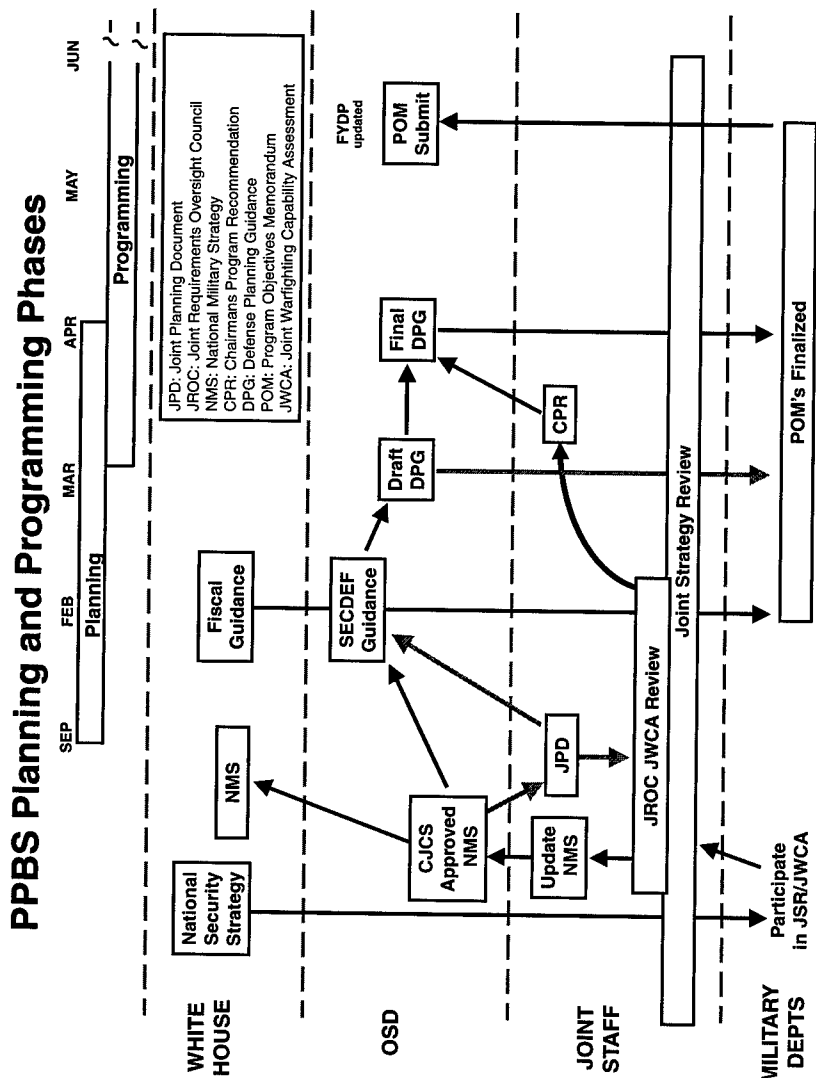


# THE SCOPE OF DEFENSE COOPERATION

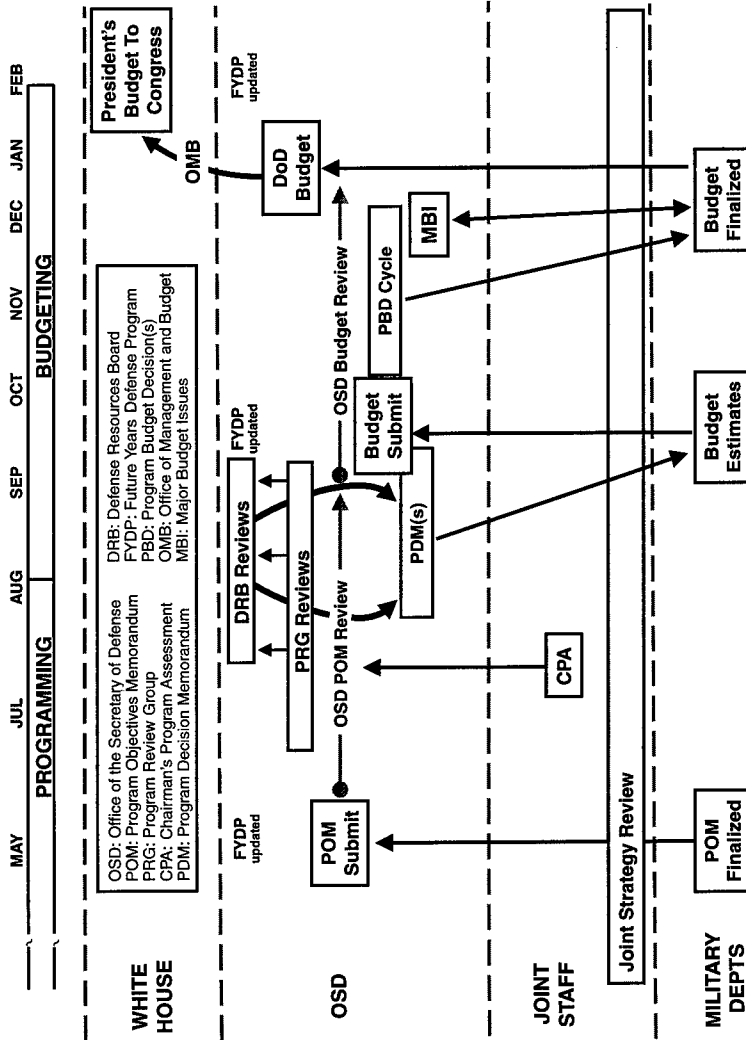


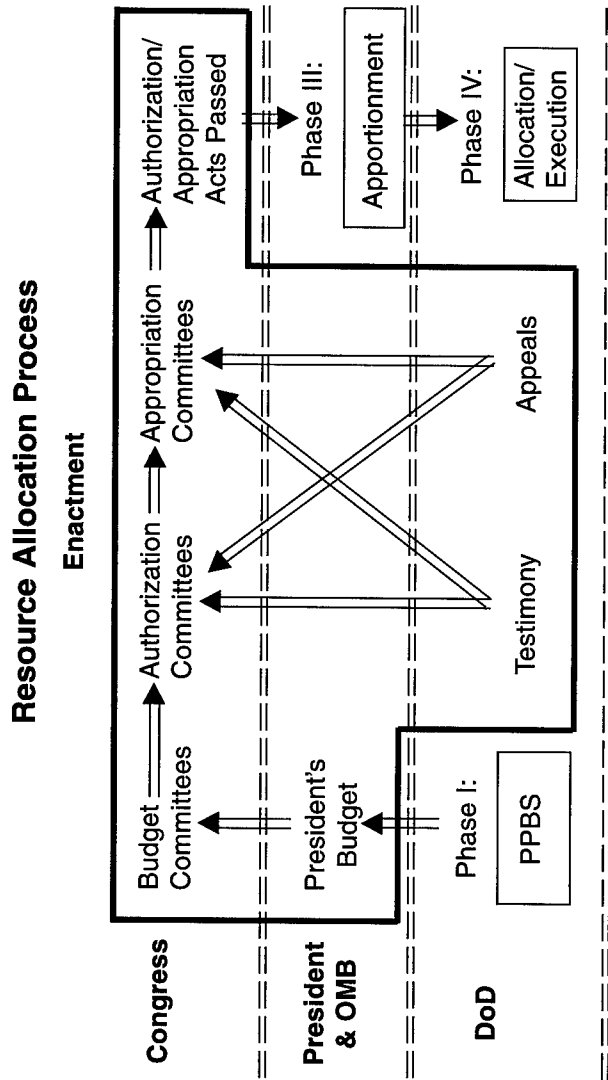
Resource Allocation Process - Overlap





# PPBS - Programming & Budgeting Phases





DSMC PROGRAM MANAGERS TOOL KIT

**PROCUREMENT APPROPRIATIONS  
(ACCOUNT NUMBERS AND BUDGET ACTIVITIES)**

<b><i>Appropriation</i></b>	<b><i>Budget Activity</i></b>
<b><i>Army (21 -)</i></b>	
Aircraft	- 2031 1. Aircraft 2. Modification of Aircraft 3. Spares & Repair Parts 4. Support Equipment & Facilities
Missile	- 2032 1. Other Missiles 2. Modification of Missiles 3. Spares & Repair Parts 4. Support Equipment & Facilities
Weapons	- 2033 1. Track Combat Vehicle 2. Weapons & Other Combat Vehicles 3. Spares & Repair Parts
Ammo	- 2034 1. Ammo 2. Ammo Production Base Support
Other	- 2035 1. Tactical & Support Vehicle 2. Commo & Electronics Equipment 3. Other Support Equipment 4. Spares & Repair Parts
<b><i>Navy (17 -)</i></b>	
Aircraft	- 1506 1. Combat Aircraft 2. Airlift Aircraft 3. Trainer Aircraft 4. Other Aircraft 5. Modification of Aircraft 6. Aircraft Spares & Repair Parts 7. Aircraft Support Equipment & Facilities
Weapons	- 1507 1. Ballistic Missiles 2. Other Missiles 3. Torpedoes & Related Equipment 4. Other Weapons 5. Not Used 6. Spare & Repair Parts
Ammo	- 1508 1. Ammo, Navy 2. Ammo, Marine Corps
Shipbuilding & Conversion	- 1611 1. Fleet Ballistic Missile Ships 2. Other Warships 3. Amphibious Ships 4. Mine Warfare & Patrol Ships 5. Auxiliary, Craft & Prior Year Costs
Other	- 1810 1. Ship Support Equipment 2. Commo & Electronics Equipment 3. Aviation Support Equipment 4. Ordnance Support Equipment 5. Civil Engineer Support Equipment 6. Supply Support Equipment 7. Personal & Command Support Equipment 8. Spares & Repair Parts
<b><i>Marine Corps (17 -)</i></b>	
Procurement	- 1109 1. Not Used 2. Weapons & Combat Vehicles 3. Guided Missiles & Equipment 4. Commo & Electronics Equipment 5. Support Vehicles 6. Engineering & Other Equipment 7. Spares & Repair Parts



DSMC PROGRAM MANAGERS TOOL KIT

**PROCUREMENT APPROPRIATIONS  
(ACCOUNT NUMBERS AND BUDGET ACTIVITIES)  
(Continued)**

<i><b>Appropriation</b></i>	<i><b>Budget Activity</b></i>
<b><i>Air Force (57 -)</i></b>	
Aircraft	- 3010 1. Combat Aircraft 2. Airlift Aircraft 3. Trainer Aircraft 4. Other Aircraft 5. Modification of In-Service Aircraft 6. Aircraft Spares & Repair Parts 7. Aircraft Support Equipment & Facilities
Missile	- 3020 1. Ballistic Missiles 2. Other Missiles 3. Modification of In-Service Missile 4. Spares & Repair Parts 5. Other Support
Ammo	- 3011 1. Ammo 2. Weapons
Other	- 3080 1. Not Used 2. Vehicular Equipment 3. Electronics & Telecommunications Equipment 4. Other Base Maintenance & Support Equipment 5. Spares & Repair Parts
<b><i>Defense (97 -)</i></b>	
Defense-Wide	- 0300 1. Major Equipment 2. Special Operations Command 3. Chemical/Biological Defense
National Guard & Reserve Equipment	- 0350 1. Reserve Equipment 2. National Guard Equipment
Defense Production Activity Purchase	- 0360 1. Defense Production Activity Purchases
Chemical Agents & Munitions Destruction	- 0390 1. Chemical Agents & Munitions Destruction-R D T&E 2. Chemical Agents & Munitions Destruction-Procurement 3. Chemical Agents & Munitions Destruction-O&M

Reference Source: FY99 Budget of US Government, pp255-277

DSMC PROGRAM MANAGERS TOOL KIT

**RDT&E APPROPRIATIONS  
( ACCOUNT NUMBERS)**

<i><b>Appropriation</b></i>	<i><b>Account Number</b></i>
RDT&E, Army	21 - 2040
RDT&E, Navy	17 - 1319
RDT&E, Air Force	57 - 3600
RDT&E, Defense Wide	97 - 0400
Development T&E, Defense	97 - 0450
Operational, T&E, Defense	97 - 0460

**RDT&E APPROPRIATIONS  
(RELATIONSHIP BETWEEN BUDGET ACTIVITIES AND  
RESEARCH CATEGORIES)**

<i><b>Budget Activity</b></i>	<i><b>Research Category</b></i>	<i><b>Budget Activity Title</b></i>	<i><b>Program Element #s</b></i>
* { 1	6 . 1	Basic Research	0 6 0 1 x x x
2	6 . 2	Applied Research	0 6 0 2 x x x
3	6 . 3a	Advanced Technology Devel	0 6 0 3 x x x
4	6 . 3b	Dem/Val	0 6 0 3 x x x
5	6 . 4	Engineer and Mfg Devel (EMD)	0 6 0 4 x x x
6	6 . 5	RDT&E Management Support	0 6 0 5 x x x
7	6 . 6	Operational System Devel	0 1 0 x x x ; 0 2 0 x x x ; 0 3 0 x x x ; etc .

NOTES:

1. Budget Activities specified by DoD 7000.14-R; Research Categories specified by DoD 7045.7-H
2. While the title of the Acquisition Life Cycle phase preceding EMD is now called Program Definition and Risk Reduction (PDRR) in Acquisition Directives, Financial Management Directives still refer to budget activity associated with this acquisition phase as Demonstration Validation.

\* OVERSIGHT BY DDR&E

DSMC PROGRAM MANAGERS TOOL KIT

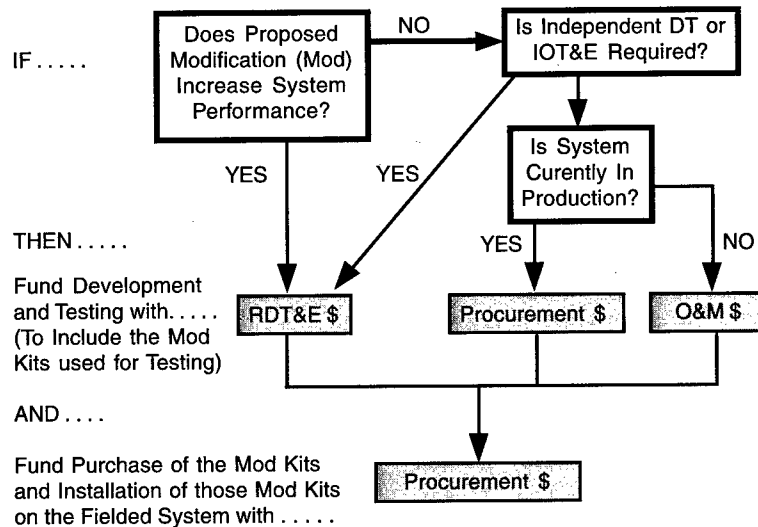
# **SAMPLE** **NAVY APPROPRIATIONS AND BUDGET ACTIVITIES**

APPRN/ BUDGET ACTIVITY	RESEARCH CATEGORY NUMBER / NOMENCLATURE	BELOW THRESHOLD REPROGRAM RULES *		YEARS AVAIL FOR OBLIG PURPOSES	FUNDING POLICY
		Max In	Max Out		
<b>RDT&amp;E, N</b>					
		[At Program Element Level]			
1	6.1 Basic Research	\$4M	Greater	2	Incremental
2	6.2 Applied Research		of		
3	6.3a Advanced Tech. Devel.		\$4M		
4	6.3b Dem/ Val		or		
5	6.4 EMD		20%		
6	6.5 RDT&E Mgmt Supp (T&E Ranges) (Civilian Salaries)				
7	6.6 Oper. Systems Devel. (Post-Production)				
APPRN/ BUDGET ACTIVITY	BUDGET ACTIVITY DESCRIPTION	BELOW THRESHOLD REPROGRAM RULES		YEARS AVAIL FOR OBLIG PURPOSES	FUNDING POLICY
		Max In	Max Out		
<b>PROCUREMENT</b>					
		[At Line Item Level]			
SCN-1	Ship Conv - FBM Ships	\$10M	Greater	5	Full
SCN-2	Ship Conv - Other Warships		of		
SCN-3	Ship Conv - Aphib Ships		\$10M		
SCN-4	Ship Conv - Mine & Pat Ships		or		
SCN-5	Ship Conv - Aux, Craft & PY Costs		20%		
WPN-1	Weapons Proc. - Bal. Msl			3	
WPN-2	Weapons Proc. - Other Msl				
WPN-3	Weapons Proc. - Torp & Eq.				
WPN-4	Weapons Proc. - Other Wpn				
WPN-5	Weapons Proc. - Other Ord.				
WPN-6	Weapons Proc. - Spares & Repair Parts				
OPN-1	Other Proc. - Ship SE				
OPN-2	Other Proc. - Comm/Elec Eq				
OPN-3	Other Proc. - Aviation SE				
OPN-4	Other Proc. - Ordnance SE				
OPN-5	Other Proc. - Civil Engr SE				
OPN-6	Other Proc. - Supply SE				
OPN-7	Other Proc. - Pers & Com SE				
OPN-8	Other Proc. - Spares & Rep Parts				
APN-1	Aircraft Proc. - Combat				
APN-2	Aircraft Proc. - Airlift				
APN-3	Aircraft Proc. - Trainer				
APN-4	Aircraft Proc. - Other				
APN-5	Aircraft Proc. - Mods				
APN-6	Aircraft Proc. - Spares				
APN-7	Aircraft Proc. - SE & Fac.				
<b>O&amp;M, N</b>	Operations & Maintenance	\$15M	\$15M	1	Annual
<b>MILPER, N</b>	Military Personnel	\$10M	No Restriction	1	Annual
<b>MILCON, N</b>	Military Construction	Lesser of +\$1M or 25%	No Restriction	5	Full

\* Below Threshold Reprogramming for RDT&E (for PEs) allowed for each year funds avail for obligation.

# DSMC PROGRAM MANAGERS TOOL KIT

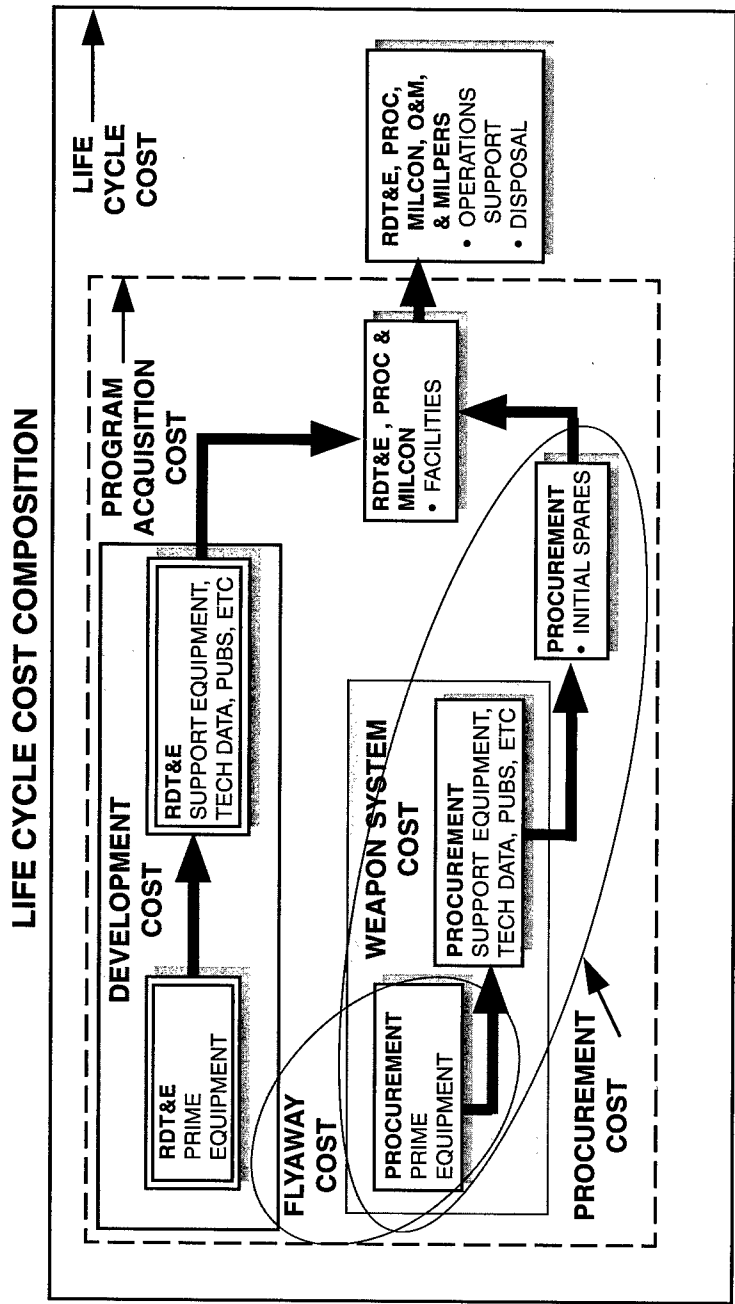
## PRODUCT IMPROVEMENTS Funding Decision Tree



## BELOW THRESHOLD REPROGRAMMING

APPN	MAX INTO	MAX OUT	LEVEL OF CONTROL	OBL AVAIL
<b>RD&amp;E</b>	+ \$ 4M	GREATER OF - \$ 4M - 20 %	PROGRAM ELEMENT	2 YEARS
<b>PROC</b>	+ \$ 10M	GREATER OF - \$ 10 M - 20 %	LINE ITEM	3 YEARS (SCN: 5 YEARS)
<b>O&amp;M</b>	+ \$ 15M	+ \$ 15M	BUDGET ACTIVITY SOME BA 1 SUB- ACTIVITY LIMITATIONS ON DECREASES (OPERATING FORCES)	1 YEAR
<b>MILPERS</b>	+ \$ 10M	NO CONGRESSIONAL RESTRICTION	BUDGET ACTIVITY	1 YEAR
<b>MILCON</b>	LESSOR OF + \$ 2M + 25%	NO CONGRESSIONAL RESTRICTION	PROJECT	5 YEARS

Reference Sources: DoD Financial Management Regulation, Volume 3 (Dec 96)  
Report from the Senate Conference Committee on Appropriations re  
Reprogramming of FY96 and later Fiscal Year O&M Appropriations



Source: DoDD 5000.4

## DSMC PROGRAM MANAGERS TOOL KIT

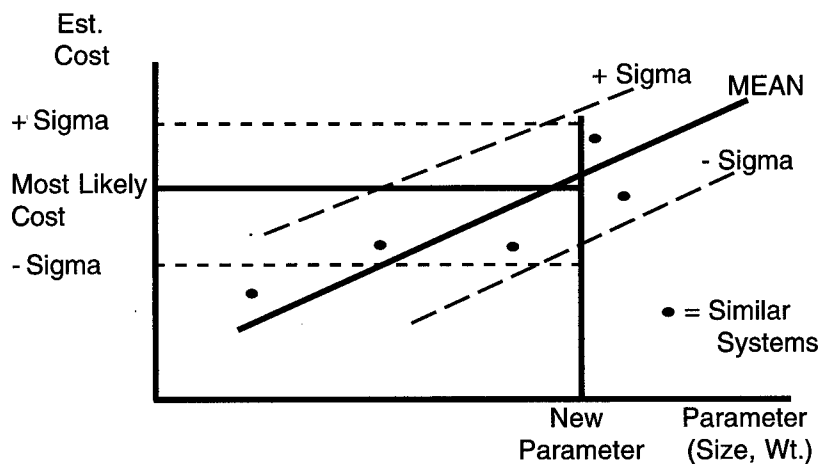
### COST ESTIMATING

<i>Type of Estimates</i>	<i>Comments</i>
Analogy -	Comparison to <u>one</u> similar existing system; based on judgments. Little or no data available; Relatively quick, easy, flexible Used in early phases (e.g., CE)
Parametric -	Comparison to <u>many</u> similar existing systems; based on statistical analysis Determine primary cost drivers and Establish Cost Estimating Relationships (CERs) Used in early phases (e.g., CE, PDRR)
Engineering or "Bottoms-Up"	Summation of "all" individual items in the system Uses WBS structure Used in middle phases (e.g., EMD)
Extrapolation -	Comparison to historical cost of <u>same</u> system Based on extrapolation from actuals Uses Learning Curve Theory Used in late phases (e.g., production and replenishment spares)

#### Guidelines

1. Make sure cost data is relevant and homogeneous. Caution: Watch out for historical data in times of change. Prior actuals may include uncompensated overtime or were priced as a "buy-in."
2. Focus on cost drivers.
3. Test sensitivities and data relationships.

#### Cost Estimating Relationships (CER) - (Parametric)

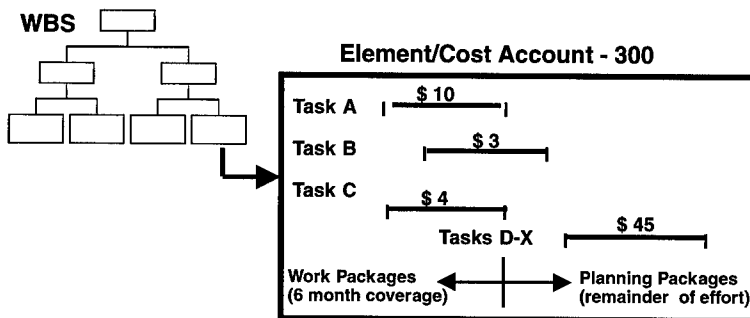


## PERFORMANCE MEASUREMENT

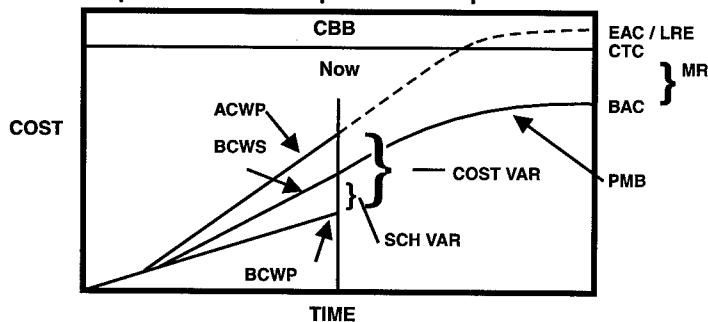
### COST & SCHEDULE PERFORMANCE MEASUREMENT

1. Define the work (WBS)
  2. Schedule the work
  3. Allocate budgets
- t Level
- } Cost Account

Defining, Planning and Budgeting



#### 4. Prepare and monitor performance profiles



#### TERMINOLOGY

BCWS - Budgeted Cost of Work Scheduled  
 BCWP - Budgeted Cost of Work Performed  
 ACWP - Actual Cost of Work Performed  
 MR - Management Reserve  
 EAC - Estimate at Completion (Govt)  
 LRE - Latest Revised Estimate (Contractor)  
 BAC - Budget at Completion  
 CBB - Contract Budget Base(CTC+AUW)  
 CTC - Contract Target Cost  
 PMB - Performance Measurement Baseline  
 AUW - Auth Unpriced Work

#### VARIANCES

Cost Variance  
 Schedule Variance

Cost Variance %

Schedule Variance %

Variance at Completion

CV = BCWP - ACWP  
 SV = BCWP - BCWS

$CV\% = \frac{BCWP - ACWP}{BCWP}$

$SV\% = \frac{BCWP - BCWS}{BCWS}$

VAC = BAC - EAC

#### PERFORMANCE INDICES

$$\text{Cost Performance Index CPI} = \frac{BCWP}{ACWP}$$

$$\text{Schedule Performance Index SPI} = \frac{BCWP}{BCWS}$$

$$\text{Percent Complete} = \frac{BCWP(cum)}{BAC}$$

$$\text{Percent Spent} = \frac{ACWP(cum)}{BAC}$$

#### ESTIMATE AT COMPLETION

$$\text{EAC (Lowest Est.)} = \frac{BAC}{CPI(cum)}$$

$$\text{EAC (Highest Est.)} = ACWP(cum) + \frac{BAC - BCWP(cum)}{CPI(cum) * SPI(cum)}$$

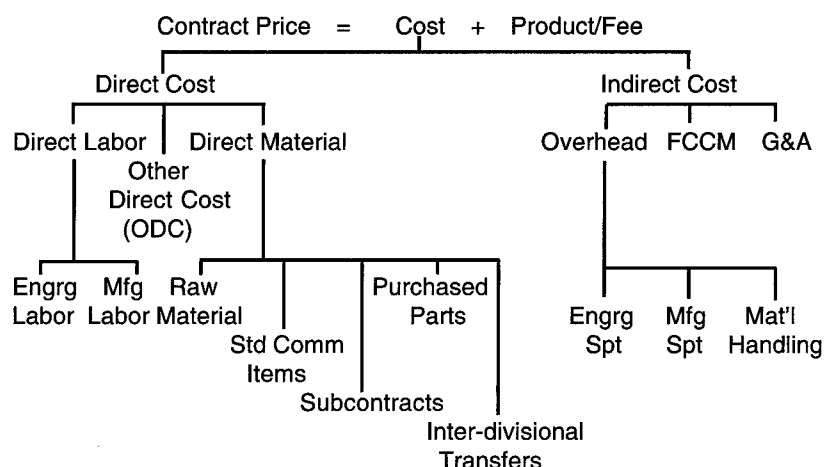
#### TO COMP PERFORMANCE INDICES

$$TCPI(EAC) = \frac{BAC - BCWP(cum)}{EAC - ACWP(cum)}$$

## DSMC PROGRAM MANAGERS TOOL KIT

### CONTRACTING

#### COMPONENTS OF CONTRACT PRICE



#### TYPICAL CONTRACT TYPE BY PHASE

CE	PDRR	EMD	PROD
CPFF, FFP	CPFF, CPIF	CPIF, CPAF	FPI(F), FFP

### TYPES OF CONTRACTS

**Cost Family:** Appropriate when product not well defined; high risk; contractor provides best efforts; Government pays all allowable costs. Fee varies by type.

**Cost Plus Fixed Fee (CPFF)** - Fee same regardless of actual cost outcome.

**Cost Plus Incentive Fee (CPIF)** - Actual fee earned computed by applying share ratio to over/under run, subject to min/max fee limits.

**Fixed Price Family:** Product well defined, low risk; contractor must deliver product.

**Firm Fixed Price (FFP)** - Price fixed regardless of actual cost incurred.

**Fixed Price Incentive Firm Target [FPI(F)]** - Final price computed by applying share ratio to over/under run, subject to ceiling price limitation.

**Award Fee (AF)** - Either stand alone Cost Plus Award Fee (CPAF) or combined with cost or fixed price types. AF unilaterally determined by government based on subjective evaluation of contractor's performance.

**Fee Limits:** CPFF - Fee limited to 15% for R&D; 10% for Production and services. No statutory or FAR/DFARS regulatory limitation on other contract types.

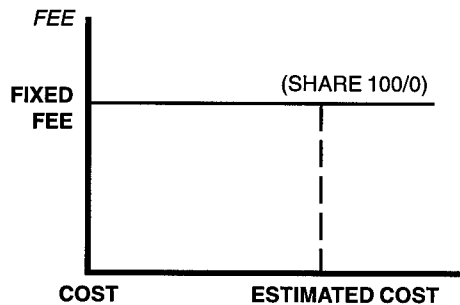


DSMC PROGRAM MANAGERS TOOL KIT

**CONTRACT TYPE FEATURES**

	<b>FIXED PRICE</b>	<b>COST REIMBURSEMENT</b>
Promise	Delivery	Best Efforts
Contractor Risk	High	Low
Cash Flow	Delivery	As Incurred
Progress Payments %	75/90/95	N/A
Administration	Low	High
Fee Limit %	None	15/10/6 on CPFF

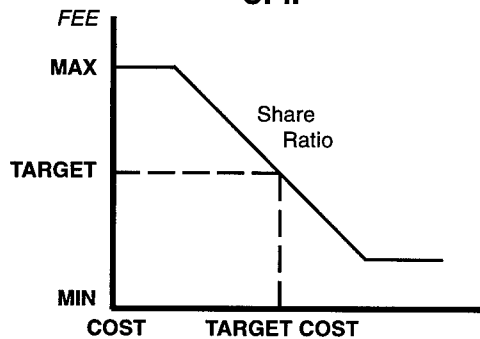
**CPFF**



$$\text{PRICE} = \text{COST} + \text{FIXED FEE}$$

Risk Highest To The Government  
Obtains Fee Regardless of Cost

**CPIF**

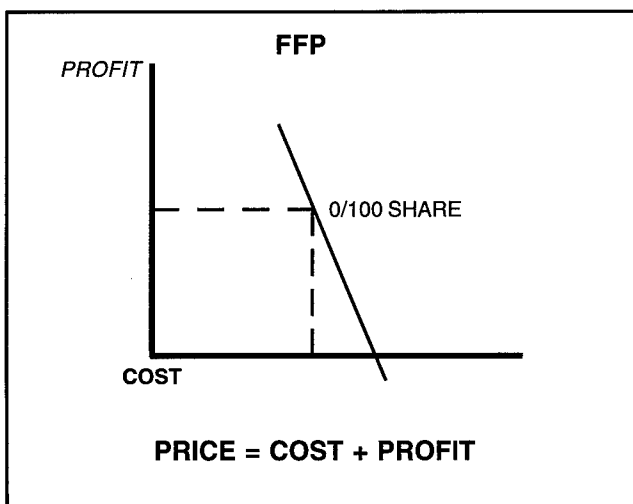
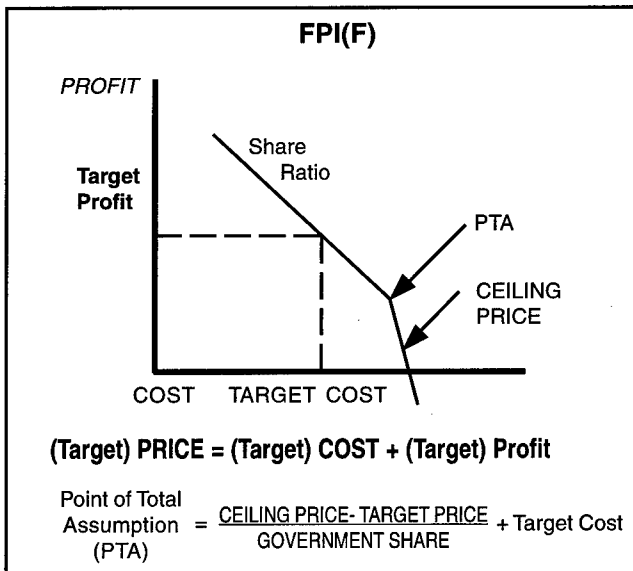


$$(\text{Target}) \text{ PRICE} = (\text{Target}) \text{ COST} + (\text{Target}) \text{ FEE}$$

All Reasonable Cost Paid  
Shared Risk Between Min/Max Fee

DSMC PROGRAM MANAGERS TOOL KIT

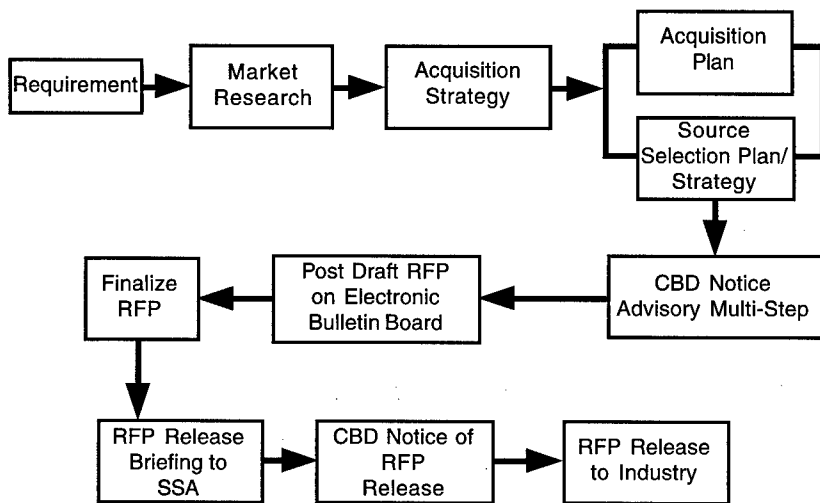
**CONTRACT TYPE FEATURES**  
(Continued)



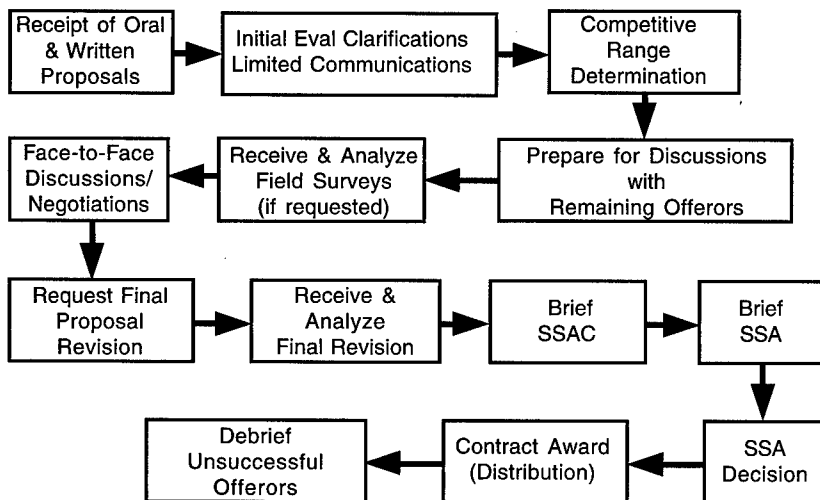
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DSMC PROGRAM MANAGERS TOOL KIT

**PRE-SOLICITATION PROCESS**



**POST-SOLICITATION PROCESS**



## DSMC PROGRAM MANAGERS TOOL KIT

### OTHER WAYS TO BUY

- **GSA Multiple Award Schedules (MAS)**
  - *General Services Administration contracts for both products and services- available to all agencies.*
- **Government Wide Agency Contract (GWACs)**
  - *similar to MAS but more restricted in products and services available.*
- **Indefinite Delivery/Indefinite Quantity Contracts**
  - *Task orders (services) & Delivery Orders (products) issued under omnibus umbrella contract.*
- **Other Transactions (See Separate OT Chart)**

### OTHER TRANSACTIONS

**Defined:** Vehicles used for basic, applied and advanced research projects and prototype development. OTs are not Contracts, Grants, or Cooperative Agreements.

**Objective:** Attract commercial companies and consortia that historically have not done business with the Department of Defense because of statutory and/or regulatory requirements. OTs are not subject to the Federal Acquisition Regulation. Designed to increase DoD access to dual use Technologies.

#### **Research Projects:**

- Where practical, government cost share should not exceed cost share of other parties.
- Use OT when standard Contract, Grant or Cooperative Agreement is not appropriate.

#### **Prototype Projects:**

- Must be directly relevant to weapons or weapon systems proposed to be acquired or developed by DoD.

## CONTRACTOR PROFITABILITY RATIOS

The basic concept of profitability ratios is to measure income against revenue or against the investment required to produce it. There are three principal profitability ratios with which you should be familiar. They are:

$$\text{Return on Sales} = \frac{\text{Net Income}}{\text{Sales}}$$

1. Return on Sales which shows what percentage of dollars are left after the company has paid for all costs, interest, and taxes. It is expressed as:

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}$$

2. Return on Total Assets which looks at the efficiency with which management has used its resources, the company's assets, to generate income. It is computed as:

$$\text{ROA} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$$

As noted, ROA addresses how well management utilizes the assets of the firm in generating income. The ROA formula reflects the combined result of Return on Sales and the total asset turnover ratio (sales/total assets), broken down as follows:

$$\text{ROE} = \frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Common Stockholders' Equity}}$$

3. Return on Common Stockholder's Equity measures the rate of return on the owners' investment—their equity in the company. This is also known as Return on Equity (ROE).

$$\text{ROE} = \frac{\text{Net Inc.} - \text{Pref. Div.}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Common Stockholder's Equity}}$$

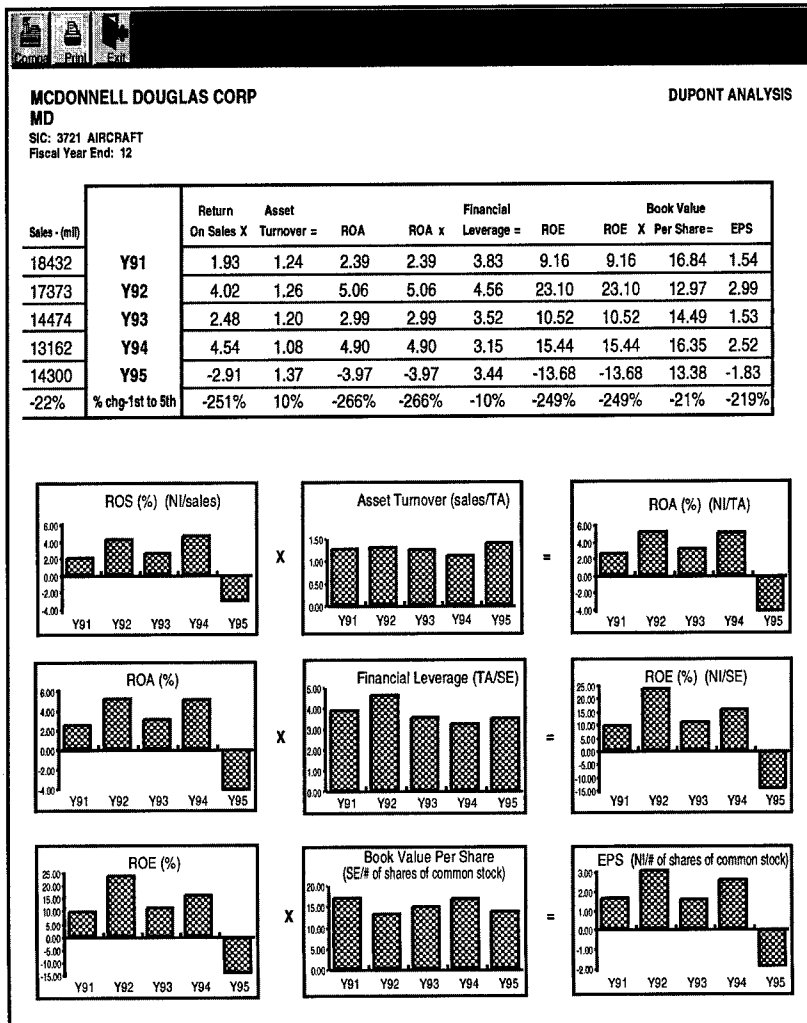
ROE can also be broken into two components: these being return on assets adjusted for preferred dividends and financial leverage (a ratio reflecting the relationship of creditor to owner financing—expressed as total assets/ common stockholders equity). This is shown by:

$$\text{Earnings Per Share} = \frac{\text{Net Income Minus Preferred Dividends}}{\text{Number of Shares of Common Stock Outstanding}}$$

These profitability ratios give three different viewpoints concerning the "bottom line" on the income statement—how much net profit is being made on each sale, how much is being made for the assets that are employed, and how much is being made for the company owners. From an owner's perspective, another profitability ratio you may be aware of is Earnings Per Share (EPS):

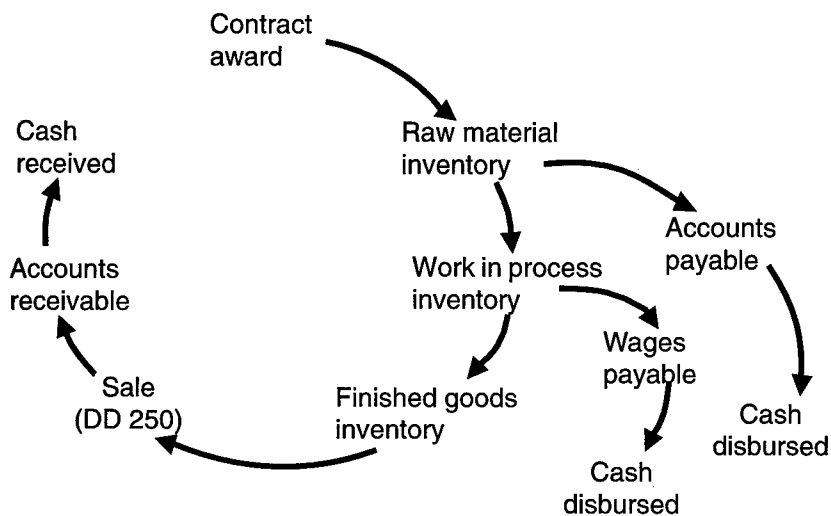
# DSMC PROGRAM MANAGERS TOOL KIT

## FINANCIAL ANALYSIS SHEET (EXAMPLE)

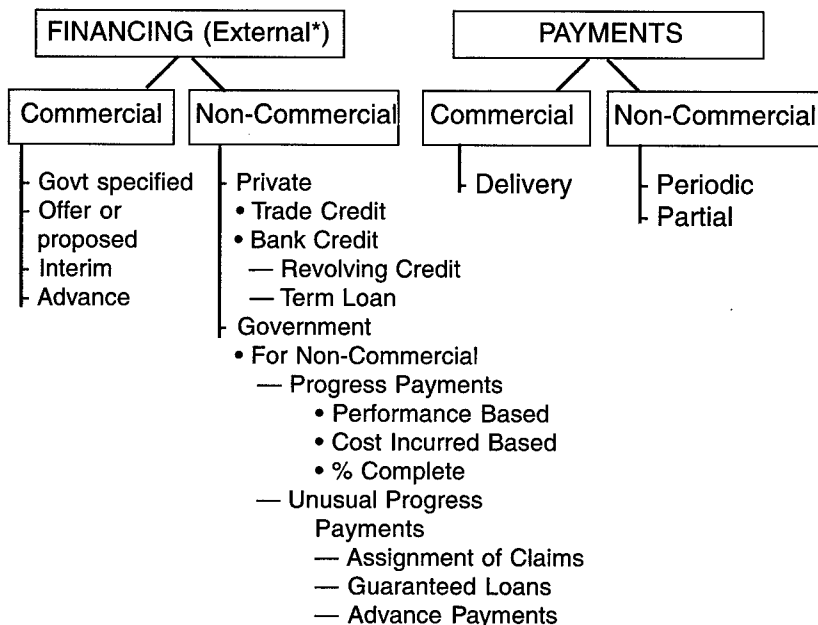


## DSMC PROGRAM MANAGERS TOOL KIT

### CASH CYCLE

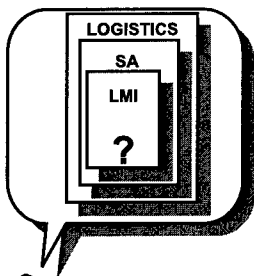


### CONTRACTOR FINANCING AND PAYMENTS



\* Internal Contractor Financing  
— Retained Earnings

## DSMC PROGRAM MANAGERS TOOL KIT



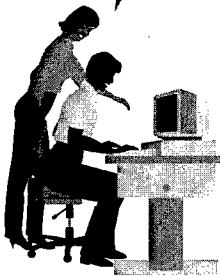
### SUPPORTABILITY ANALYSES

Anything analytical that has something to do with logistics

- **SUPPORTABILITY ANALYSIS (SA)**  
The tailored application of engineering efforts during acquisition, to identify/ solve logistics issues through an iterative SE process of definition, synthesis, tradeoff, T&E.

- **LOGISTICS MANAGEMENT INFORMATION (LMI):**

The documentation associated with SA.



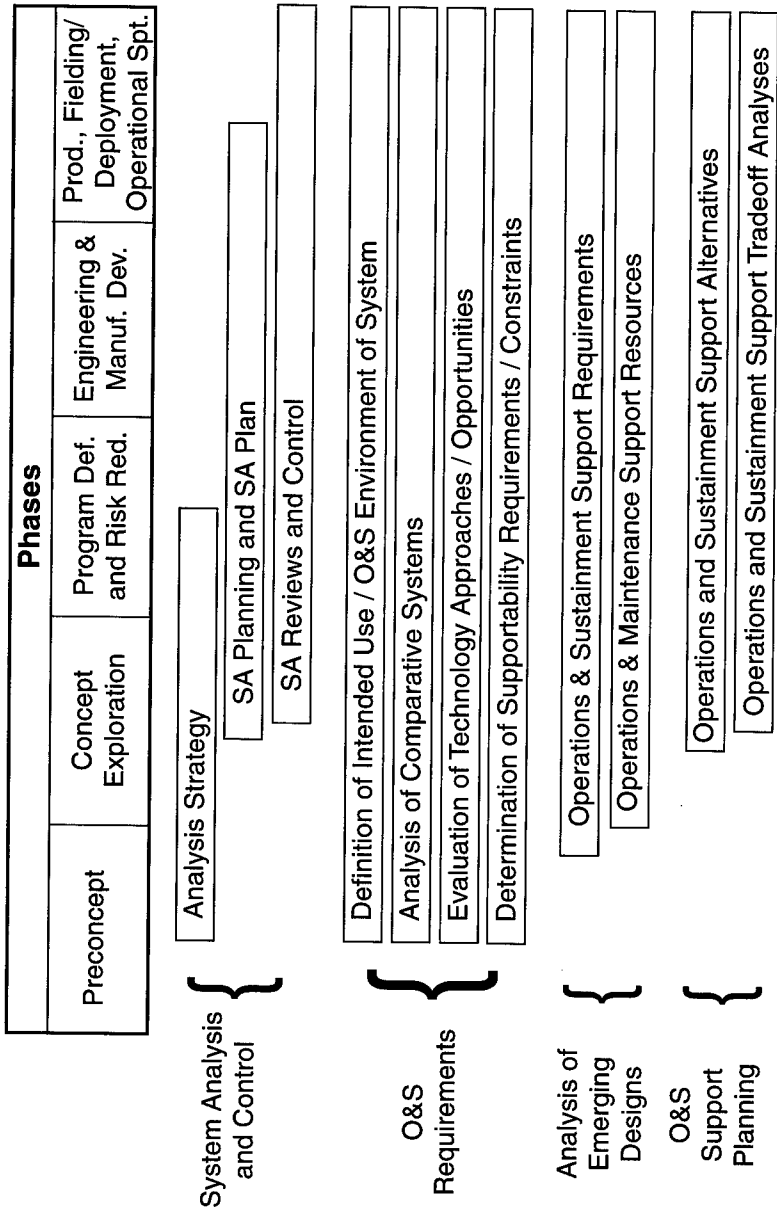
### **BEST PRACTICE:** *Supportability Analyses*



- Tailored!
- Part of iterative SE process
- Assists in
  - Defining support
  - Influencing design
- Uses (*not* duplicates) other data & analyses
- Documented and communicated



BEST PRACTICE: SUPPORTABILITY ANALYSIS ACTIVITIES

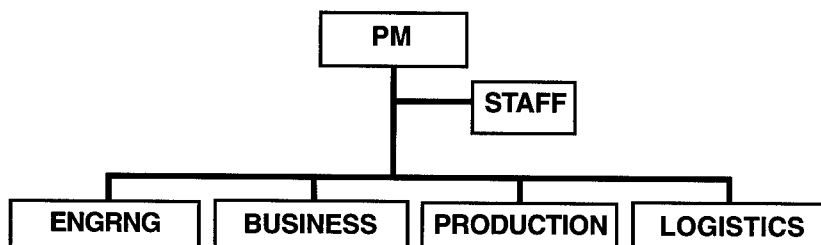


## ACQUISITION LOGISTICS

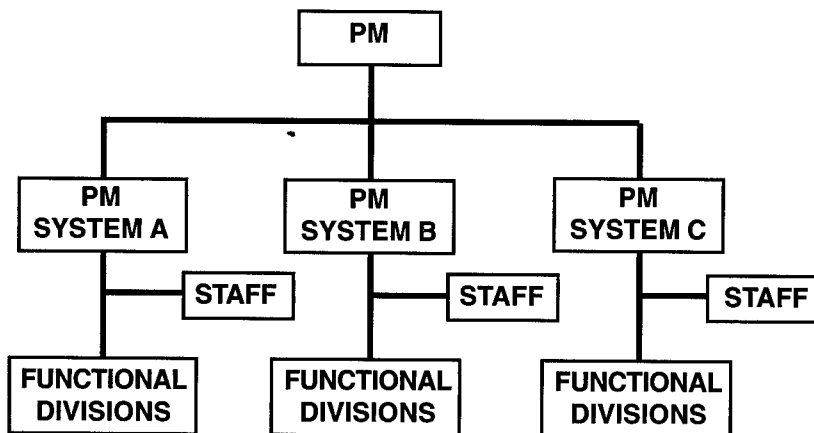
1. *Maintenance Planning* - establishes maintenance concepts and requirements.
2. *Manpower & Personnel* - identification of personnel skills and grades required to support operation and maintenance of system.
3. *Supply Support* - determine requirements to acquire and manage spare and repair parts.
4. *Technical Data* - scientific and technical information used to support systems acquisition.
5. *Training & Training Support* - determine requirements to acquire training devices and conduct training of operators and maintenance personnel.
6. *Computer Resources Support* - identification of facilities, hardware, software and support tools to operate and support embedded computer systems.
7. *Facilities* - identify real property required to support system.
8. *Packaging, Handling, Storage and Transportation* - identify designs and methods to ensure the system is preserved, packed, stored, handled and transported properly.
9. *Support Equipment* - identify all equipment required to support operation and maintenance of the system.
10. *Design Interface* - relationships of logistics related design parameters to readiness and support resource requirements; influence design for supportability.

## PROGRAM OFFICE ORGANIZATION STRUCTURES

### *Functional Structure*



### *"Pure" Product Structure*

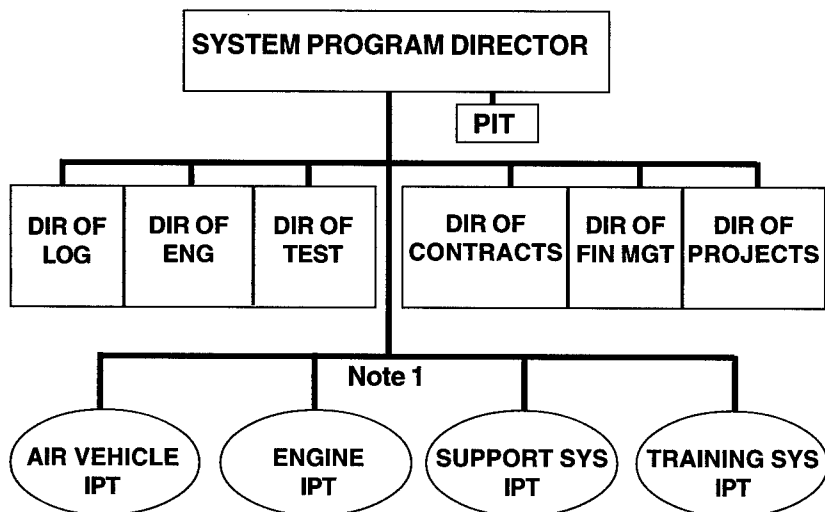


## Matrix Structure

The diagram illustrates a Matrix Structure. At the top, a box labeled 'SYSKOM HEAD' is connected to a row of three boxes labeled 'FUNCTIONAL DIRECTORS'. Below this, a grid is formed by three vertical lines (Project Managers) and four horizontal lines (Functional Divisions). The vertical lines are labeled 'PM' at the top. The horizontal lines are labeled 'ENGRNG', 'BUSINESS', 'LOGISTICS', and 'PRODUCTION' on the right side. In the center of the grid, there are three boxes labeled 'STAFF' corresponding to the three PMs. To the right of the grid, there are three boxes labeled 'BUSINESS', 'LOGISTICS', and 'ENGRNG' corresponding to the three functional divisions. Arrows point from the 'BUSINESS', 'LOGISTICS', and 'ENGRNG' boxes on the right to the corresponding functional divisions in the grid.

## PROGRAM OFFICE ORGANIZATION STRUCTURE (Continued)

### INTEGRATED PRODUCT TEAMS



IPT = Integrated Product Team  
PIT = Program Integration Team

Note 1: IPTs mirror Work Breakdown Structure

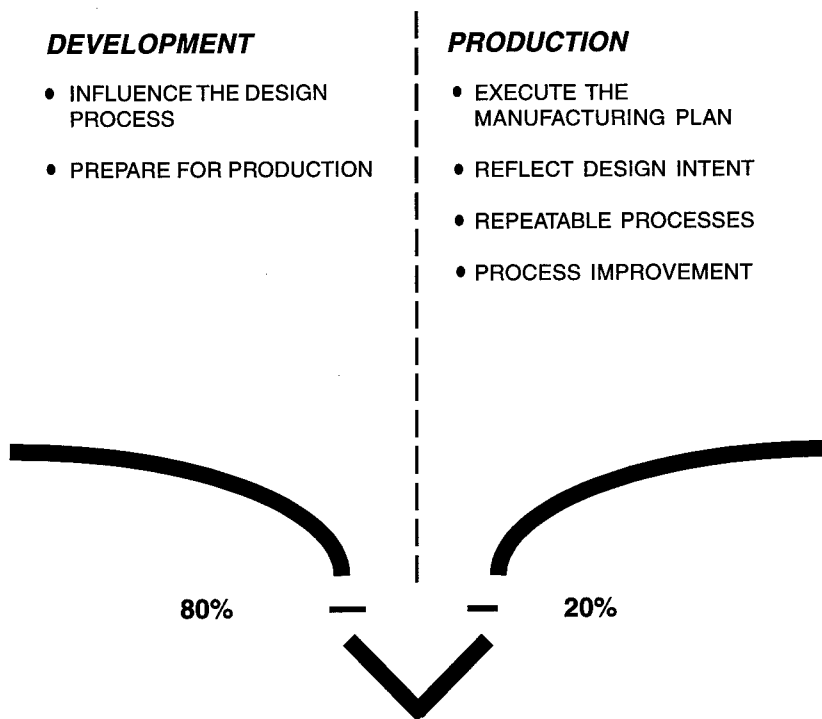
## ROLE OF MANUFACTURING MANAGEMENT WITHIN THE INTEGRATED PRODUCT TEAM

### ***DEVELOPMENT***

- INFLUENCE THE DESIGN PROCESS
- PREPARE FOR PRODUCTION

### ***PRODUCTION***

- EXECUTE THE MANUFACTURING PLAN
- REFLECT DESIGN INTENT
- REPEATABLE PROCESSES
- PROCESS IMPROVEMENT



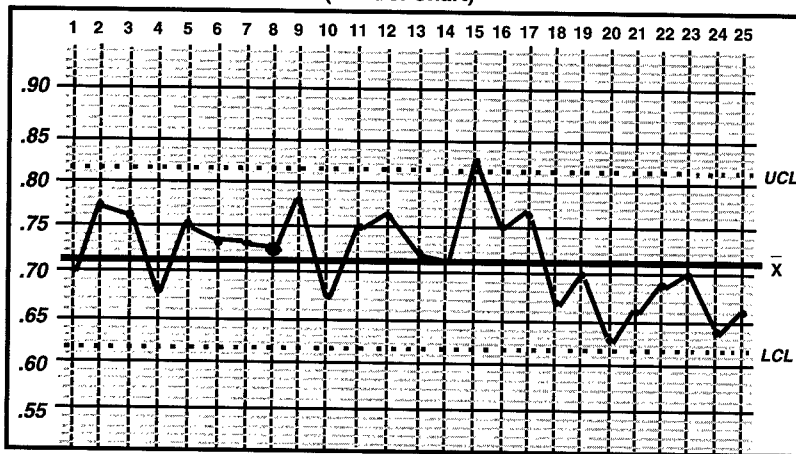
### ***UNIFORM, DEFECT-FREE PRODUCT***

- CONSISTENT PERFORMANCE
- LOWER COST

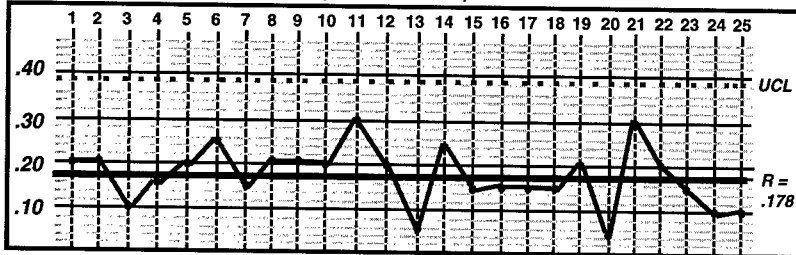
## VARIABILITY CONTROL

- GOAL: Minimize and control manufacturing variation on key product characteristics
- WHY: Direct correlation between deviation from nominal value on key characteristics and product quality and functionality
- TOOLS: QFD, DOE, Process control chart (Statistical Process Control, see below)

$\bar{X}$  (Control Chart)



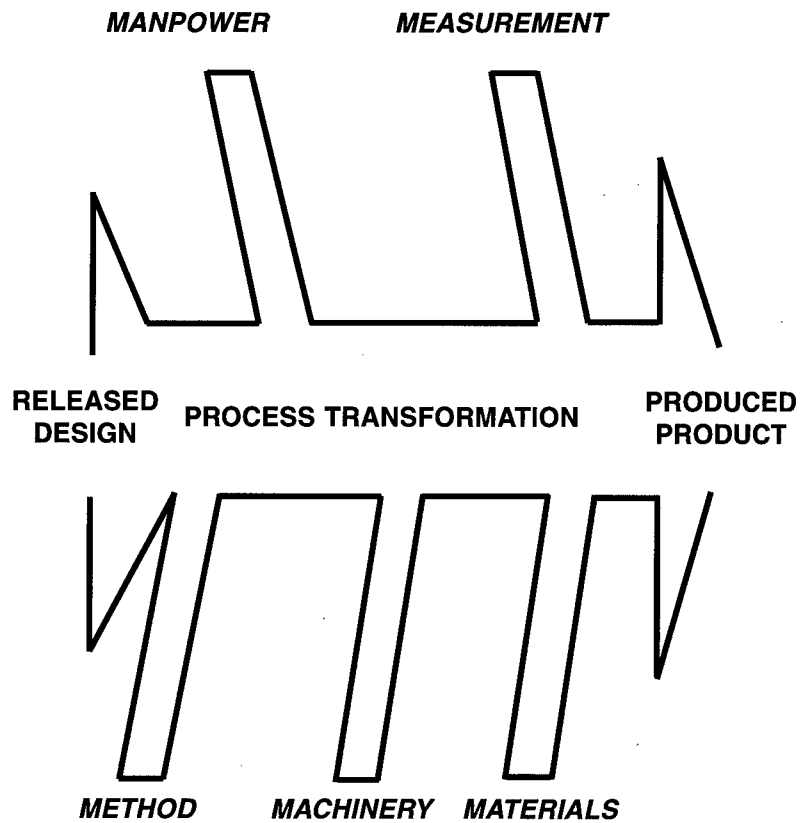
R (Control Chart)\*



\*Note: No lower control limit for R Chart for sample size below 7.

**MANUFACTURING PROCESS ELEMENTS**

**THE FIVE M's**





## **KEY MANUFACTURING QUESTIONS TO ASK Ktr REGARDING QUALITY**

1. What engineering design tools are being used during development to integrate manufacturing processes and affordability into the design?

Answer should include:

- Integrated Product Teams
- Quality Function Deployment (QFD)
  - Disciplined process employing multifunctional processes. (What? and How to do it?)
  - IPTs to get voice of customer into design
  - Matches customer desires with technical solutions
  - Technical solutions rated
- Design for Manufacturing and Assembly (DFMA)
  - Focuses on defining product design options for ease of fabrication and assembly
- Design of Experiments (DOE)
  - Identifies process factors most likely to impact quality of the end item

2. How will management determine that equitable requirements tradeoffs are made between design and manufacturing processes during development?

Answer should include:

- Perform producibility analysis during design of development hardware
  - Tradeoff design requirements against manufacturing risk, cost, production volume and existing process capability/availability

3. Of those manufacturing processes which do not exist or are unproved, what is plan to prove them out?

Answer should include:

- Compare program needs to work being done under DoDs Manufacturing Science and Technology Programs or individual service laboratory technology measurement program
  - Avoid "reinventing the wheel" syndrome

**KEY MANUFACTURING QUESTIONS  
TO ASK Ktr REGARDING QUALITY  
(Continued)**

- Milestone driven process development schedule which yields demonstrated process capability in factory representation environment before rate production begins
- Alternatives for key process considered as risk reduction if affordable

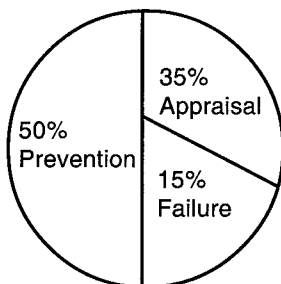
4. How does the contractor plan to insure I receive a quality product?

Answer should include:

- ISO 9000 or equivalent quality system (basic quality system) in place and consistently followed
- Advanced Quality System (AQS) encouraged
  - Key product characteristic identification
  - Process/product variability control (SPC)
  - Process capability assessment (Cp, Cpk)
  - AQS flowdown to suppliers
  - Integrated product development
  - Process fool proofing (Poka-Yoke)
  - Closed loop root cause corrective action (five whys)

5. What is your cost of quality (% of gross unit price spent on failure, appraisal, prevention)?

World Class Company = 5-10%  
(Further breakout of 10% shown below)



## DSMC PROGRAM MANAGERS TOOL KIT

### TEST & EVALUATION

#### DT&E/OT&E COMPARISONS:

##### DT&E

- Tech. perf. measurement
- Dev. agency rsp. (PM)
- Technical Personnel
- Ltd. test articles/each test
- Controlled environment
- All types of Test Articles
- Contract or involved

##### OT&E

- Operational effective/suitable
- Operational Test Agency (OTA) resp .
- 'Typical' User Personnel
- Many test articles/each test
- 'Combat' environment
- 'Production Rep' Test Articles
- Contractor may not be allowed

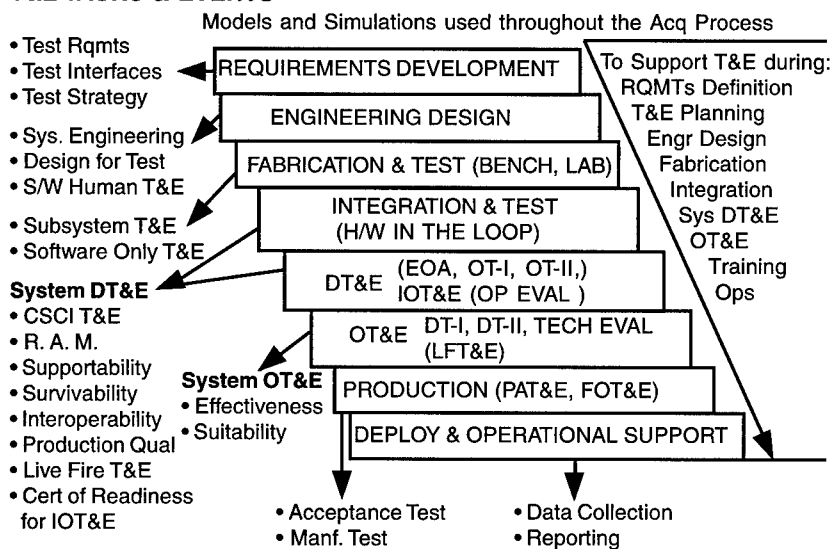
#### T&E Required before going Beyond Low Rate Initial Production

**Qualification T&E** - Verify Production Article meets Spec/PM responsible Performed by Contractor &/or Government/DPRO assistance valuable .

**Live Fire T&E (LFT&E)** - Vulnerability and Lethality/Dev'l Agency fund and execute . DOTE oversight, approval and congressional reporting for selected programs.

**Initial Operational T&E** - Operational Effectiveness and Suitability/Independent Svc OTA plan and manage. DOTE oversight, approval, and Congressional reporting for selected systems.

#### T&E TASKS & EVENTS



**Use Combined DT/OT** - single integrated DT and OT Team; combined testing; independent data analysis & reporting.

**ACAT I & II Programs** - require an independent, dedicated IOT&E to proceed beyond Low Rate Initial Production.

**AGONIZE OVER THRESHOLDS!**

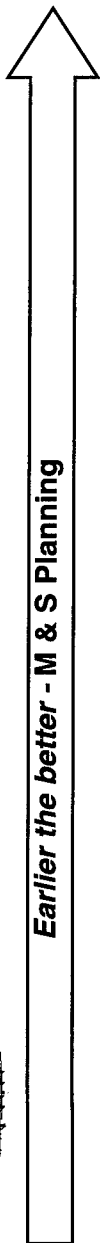
## Modeling & Simulation Planning Process

Establish a Program-level  
Simulation Working Group

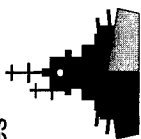


PMO monitor, update, & continuously  
explore new opportunities

**Earlier the better - M & S Planning**



Include all Service activities  
with M&S expertise.  
Determine opportunities  
for M&S. throughout the  
program lifecycle.



*Immediately consider complete  
digital integrated database operation;  
examples:*

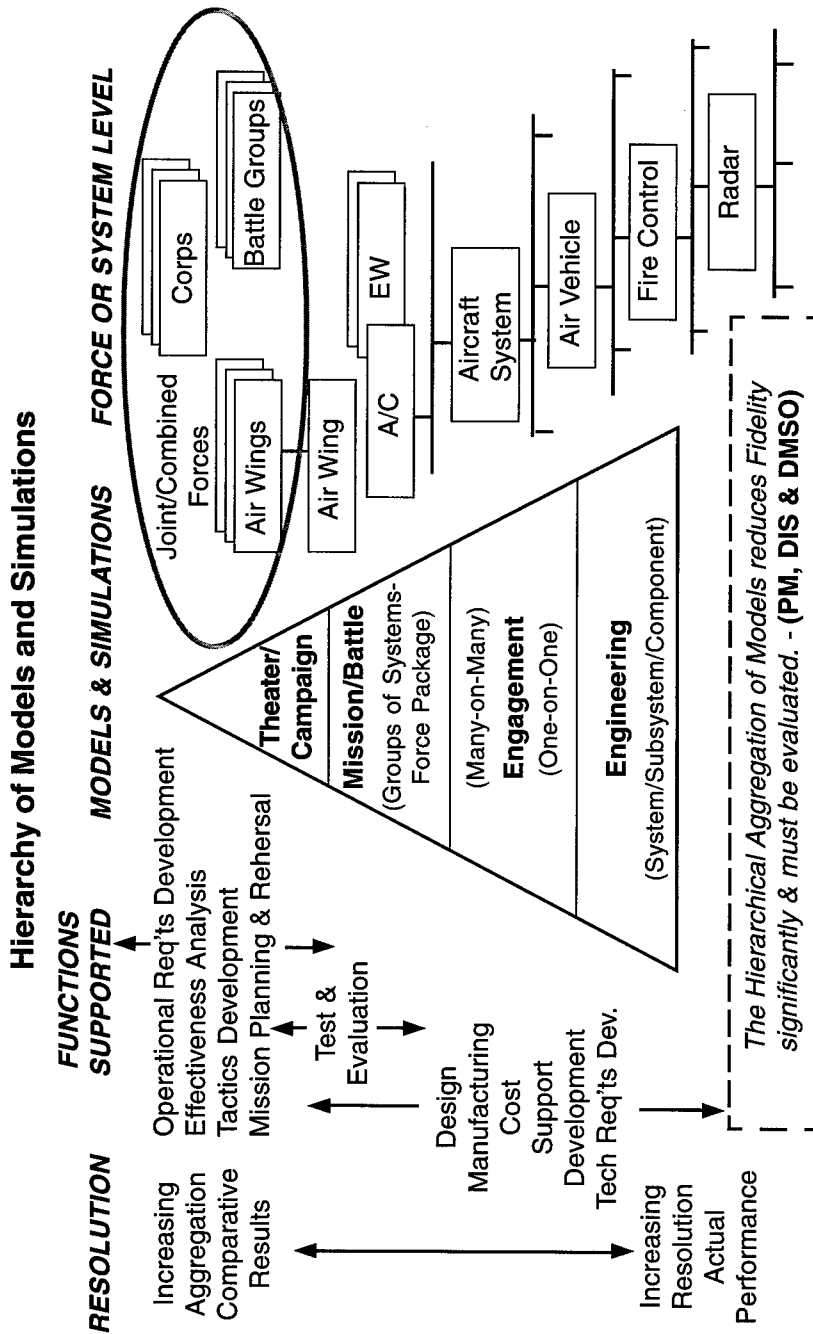
- Boeing 777
- NSSN Attack Submarine
- Comanche.

***Integral part of program planning***

**Consider:**  
Fidelity  
Re-use  
Balance  
Integration  
Verification  
Validation  
Accreditation  
Scheduling  
Budgets

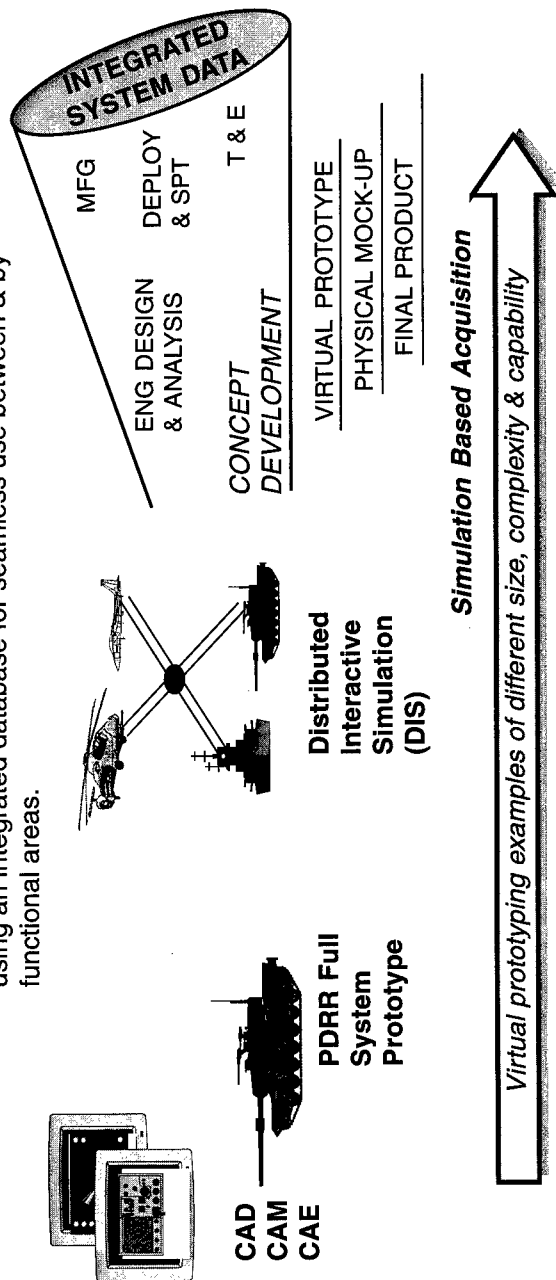
Identify VV&A activities  
for all M&S.  
  
Coordinate & document  
in a simulation support plan  
and the TEMP. Get ALL T&E  
organizations to support your  
M&S usage via formal TEMP  
agreement.





## The Evolution of Modeling & Simulation

**Simulation Based Acquisition** is the process by which simulation is incorporated and integrated throughout the functions of the acquisition of a weapon system; from concept exploration, through prototyping and design, test and evaluations, fabrication and production, to deployment and finally operations and sustainment using an integrated database for seamless use between & by functional areas.



## DSMC PROGRAM MANAGERS TOOL KIT

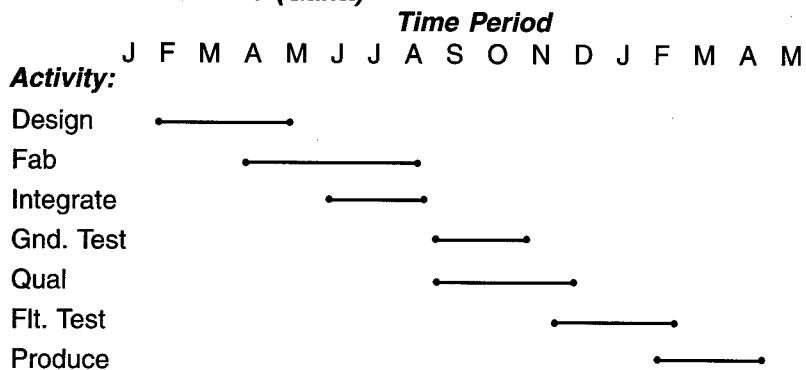
### PLANNING AND CONTROL

#### TYPICAL TIMES FOR PROGRAM ACTIVITIES

<i>Event</i>	<i>Time (months)</i>
Procurement Request Development Time	6 - 9
Contract Lead-time	9 - 12
DAB Lead-time	6 - 8
PDRR Design, Fab and Test	24 - 30
EMD Design, Fab and Qual	30 - 36
Test Readiness Review Lead-time	2 - 3
DT&E	9 - 12
OT Readiness Review Lead-time	2 - 3
OT&E	6 - 12
OT Report Preparation	3
Production Lead-time	18 - 30

#### TYPES OF PLANING CHARTS

##### MILESTONE CHART (Gantt)



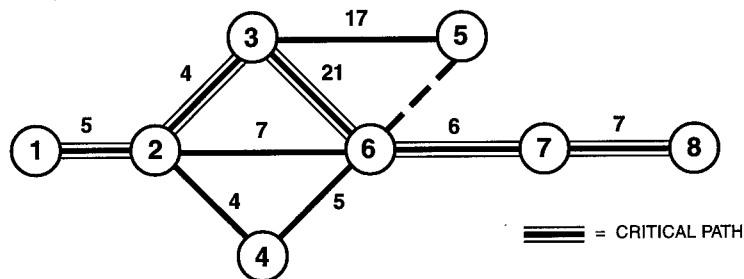
- Advantages: Simple
- Disadvantages: Difficult to show dependencies between activities unless computer constructed chart.

(ADD'L TYPES OF PLANNING CHARTS ON NEXT 5 PAGES)

# DSMC PROGRAM MANAGERS TOOL KIT

## PLANNING AND CONTROL (Continued)

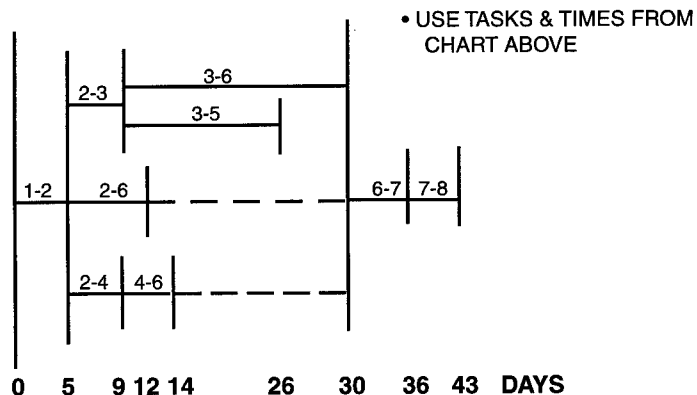
### NETWORK CHART



TASK	TASK #	TIME	COST	ACCELERATE COST	TIME
Brief	1-2	5	2,200	-	5
Transport	2-3	4	15,000	500	3
Ship GFE	2-6	7	2,500	600	4
Ship system	2-4	4	4,600	750	2
Inspect	4-6	5	0	-	5
Train maint.	3-6	21	28,000	800	14
Train oper.	3-5	17	23,000	800	12
Integ. sys.	6-7	6	13,500	-	6
Dry Run	7-8	7	9,000	400	5

- Advantages: Shows dependencies; computes critical path
- Disadvantages: Complex; computerized support required to maintain  
Does not provide any chronology

### SWAN CHART

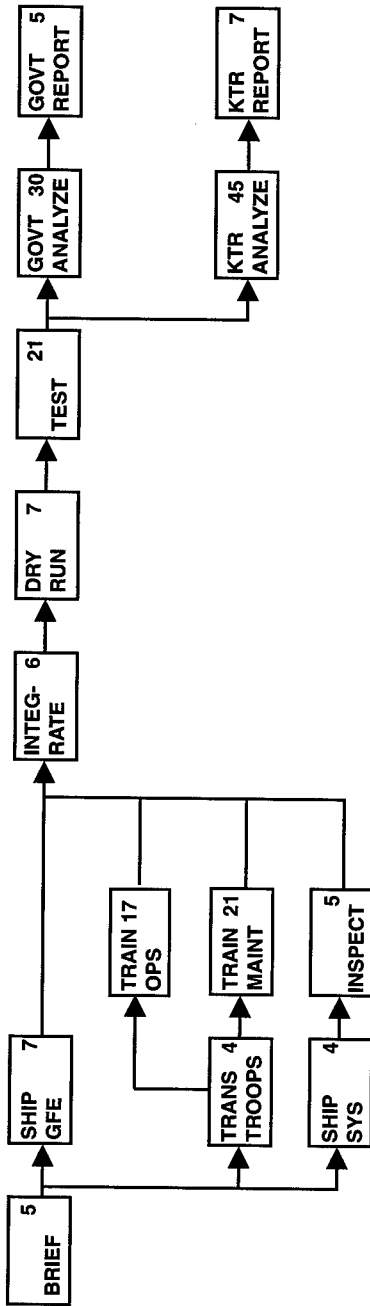


- Advantages: Shows chronology and dependencies
- Disadvantages: Complex; computerized support required to maintain

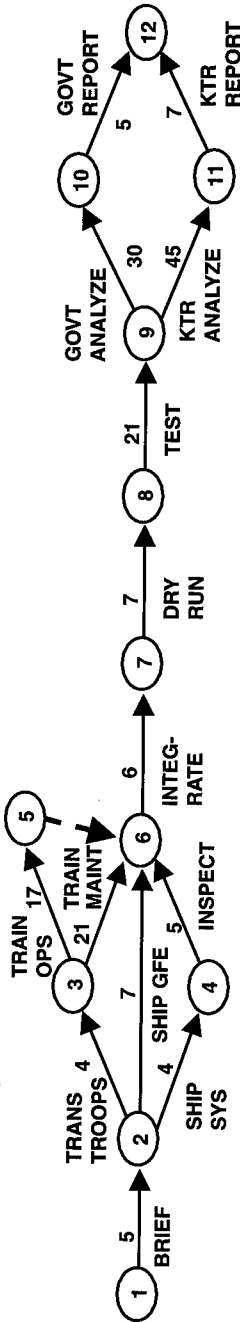


## PERT\* NETWORK CHARTS

Most widely-used PERT Display using scheduling software:

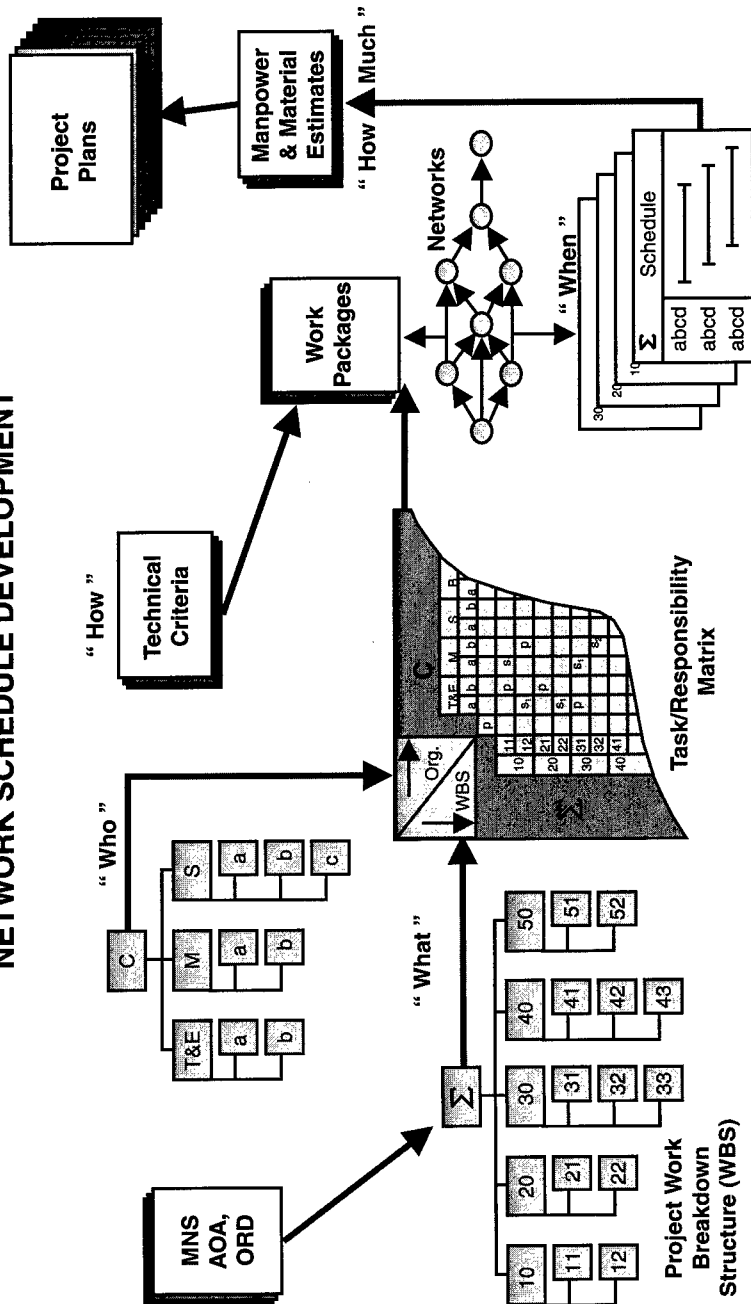


Normal PERT Display for manual method:

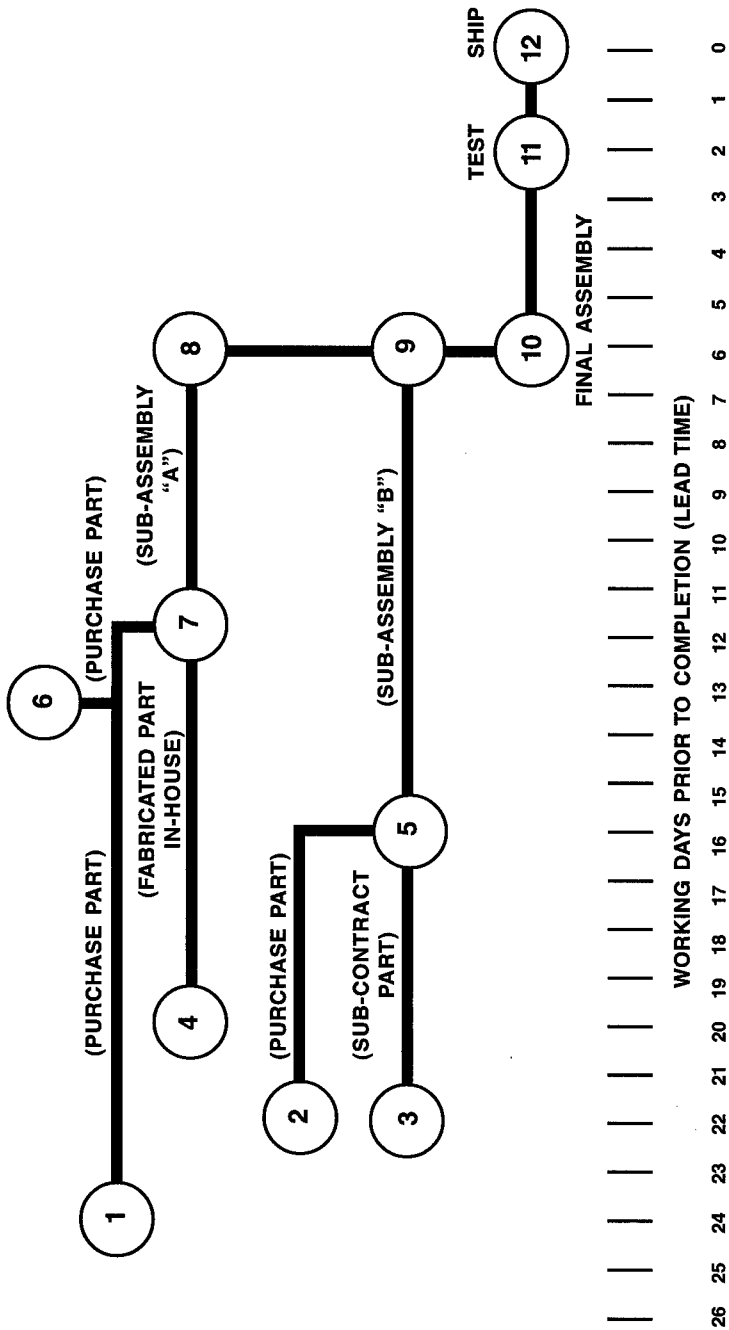


\* PERT = Program Evaluation & Review Techniques

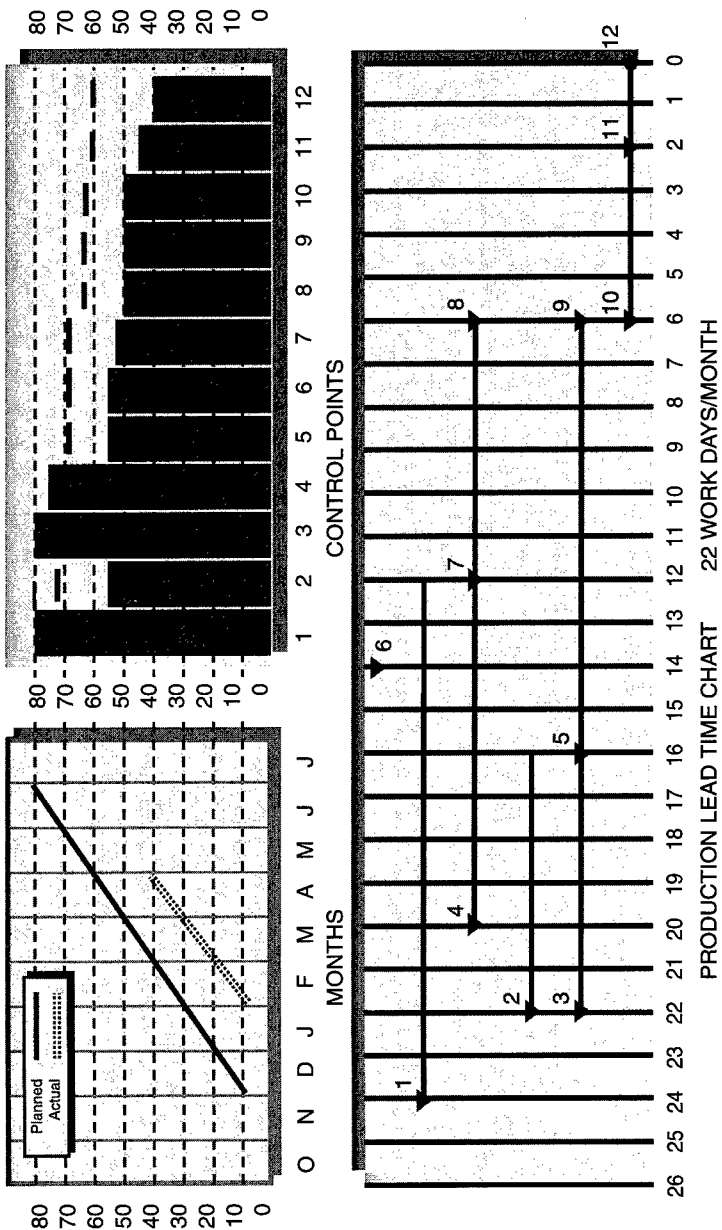
# NETWORK SCHEDULE DEVELOPMENT



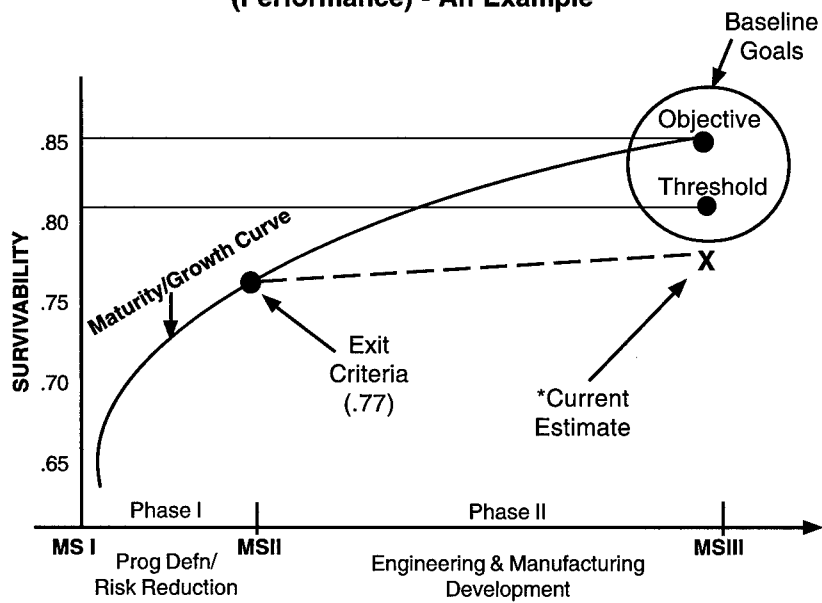
# LEAD TIME CHART



# LINE OF BALANCE TECHNIQUE



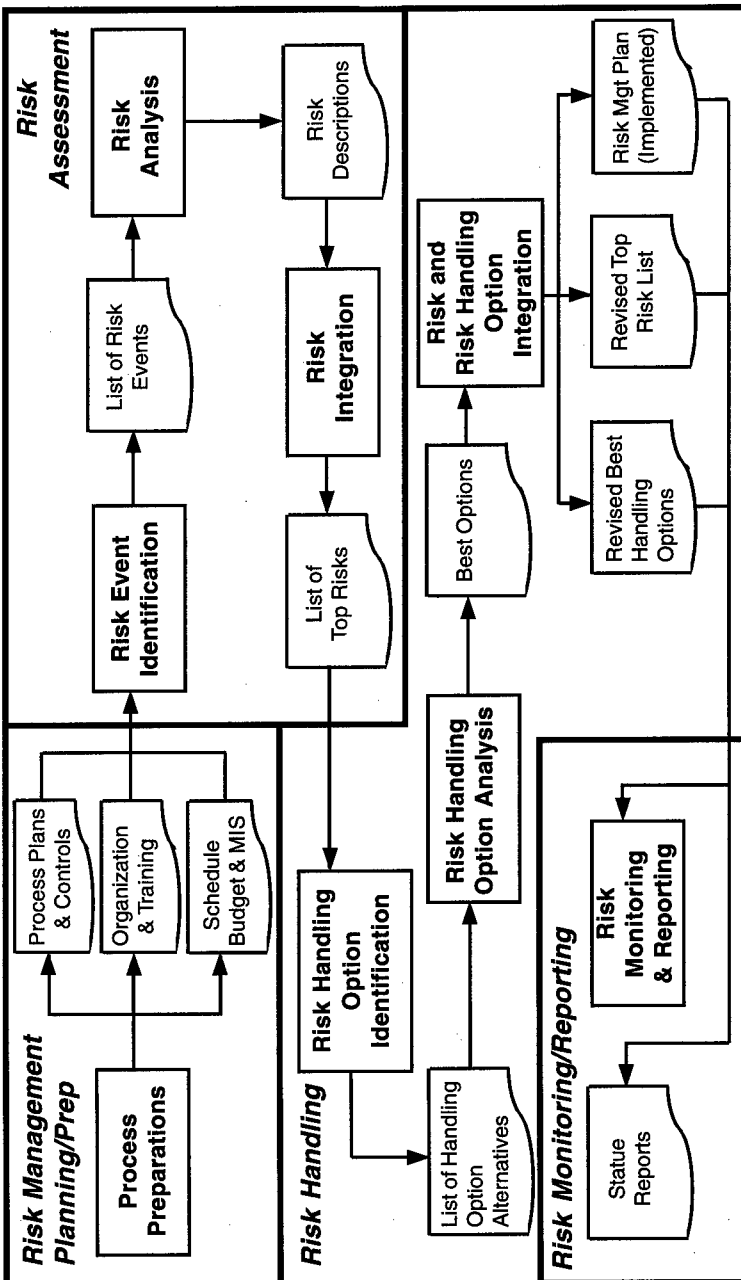
## ACQUISITION PROGRAM BASELINE (Performance) - An Example



This chart illustrates the concept of threshold, objective, exit criteria, and a breach based on PM's current estimate.

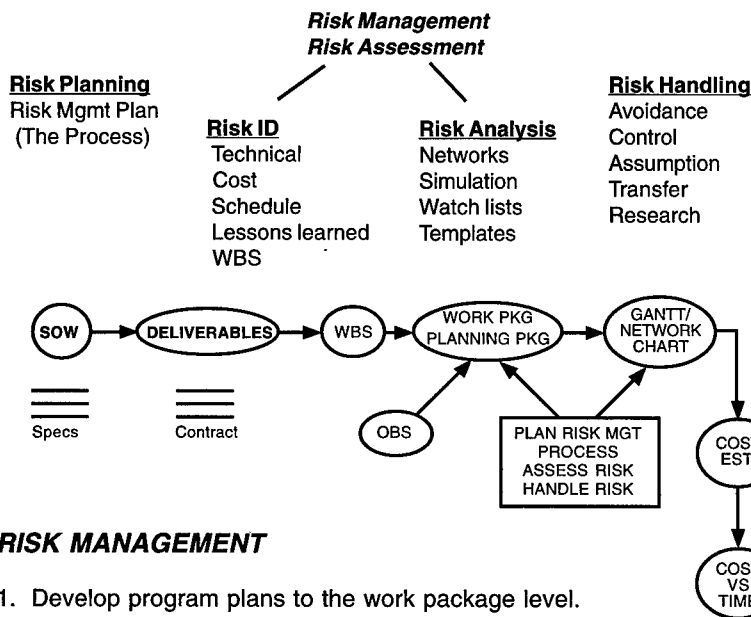
\* Here the current estimate falls below the threshold. If probability of survivability is a KPP in the APB, this would be a performance threshold breach.

# RISK MANAGEMENT PROCESS MODEL



## DSMC PROGRAM MANAGERS TOOL KIT

### RISK & TRADE-OFF ANALYSIS



### RISK MANAGEMENT

1. Develop program plans to the work package level.
2. Assess risk at the lowest work package/WBS level.
3. Manage the highest risk work packages; most others will work out.

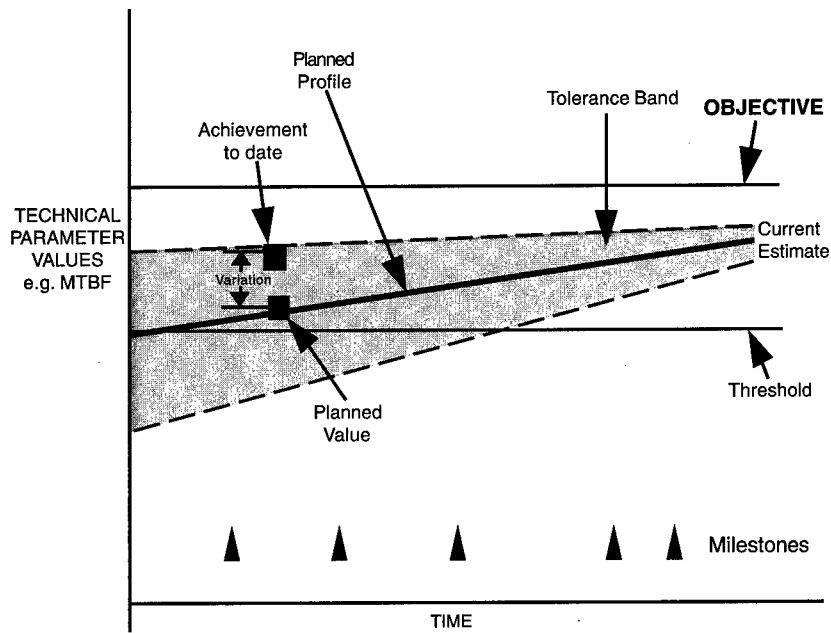
### TRADE-OFF ANALYSIS

1. Identify alternative solutions
2. Select evaluation criteria/factors & MOEs;  
i.e. cost, schedule, performance criteria
3. Weight evaluation criteria
4. Develop utility functions for each factor
5. Conduct evaluation (weighted utility summary table where  
weight is multiplied by utility function value)
6. Perform sensitivity check
7. Select highest scored alternative

**\*With Cost As an Independent Variable (CAIV), aggressive cost objectives are established as a result of trading performance and schedule for cost.**

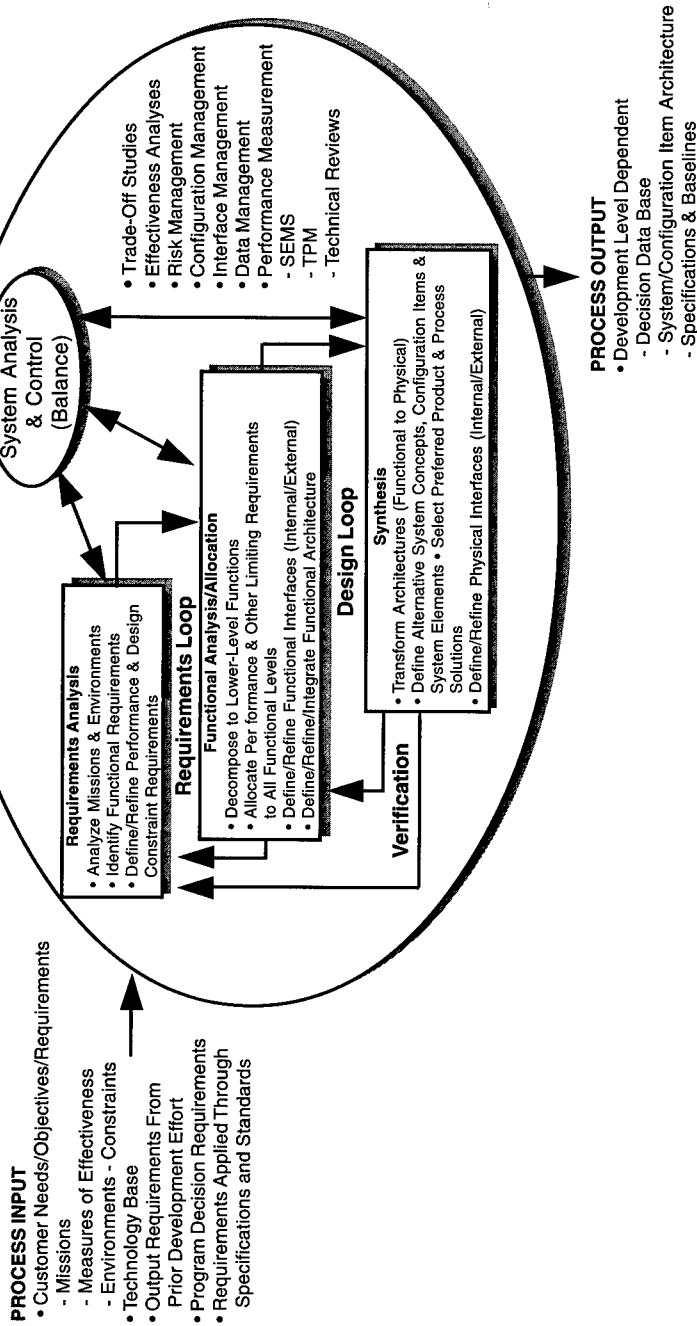
DSMC PROGRAM MANAGERS TOOL KIT

**TECHNICAL PERFORMANCE MEASUREMENT  
THE CONCEPT**



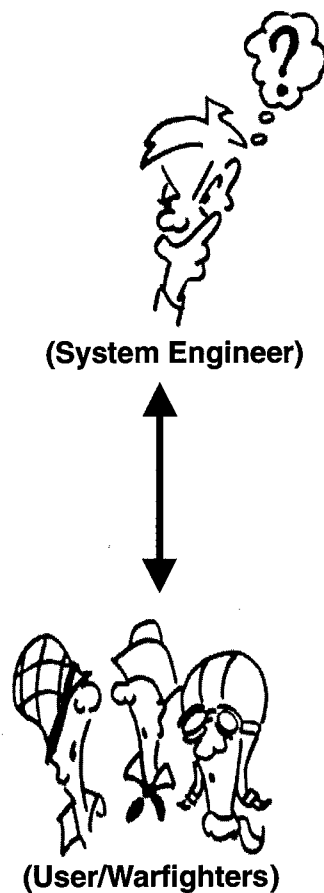


# Systems Engineering Process



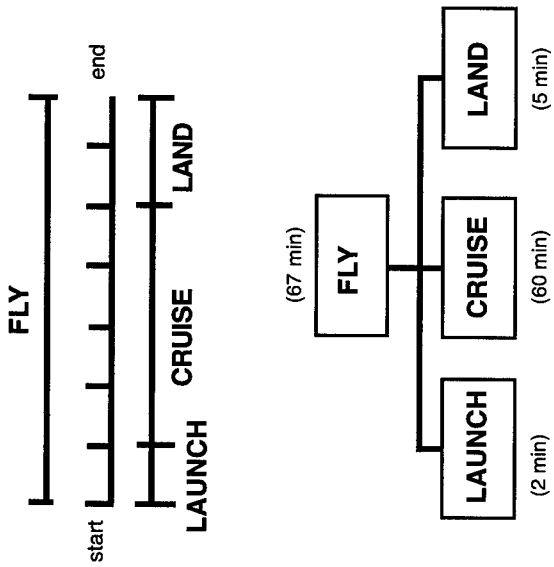
## REQUIREMENTS ANALYSIS QUESTIONS

- What are the **reasons** behind the system development?
- What are the customer **expectations**?
- **Who** are the users and how do they **intend to use** the product?
- What do the users **expect** of the product?
- What are their level of **expertise**?
- What **environmental** characteristics does the system have to comply with?

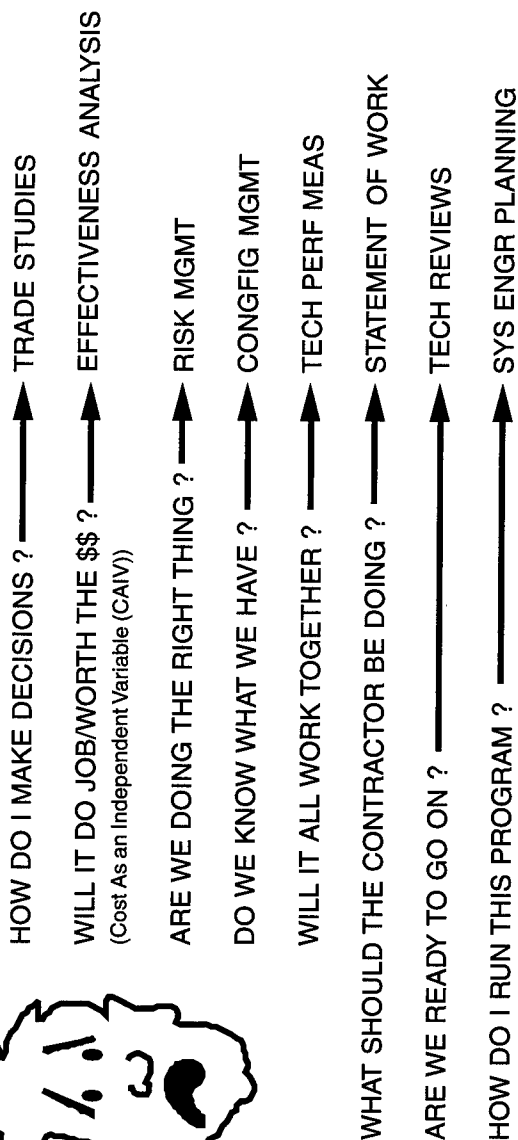


## Functional Analysis/Allocation

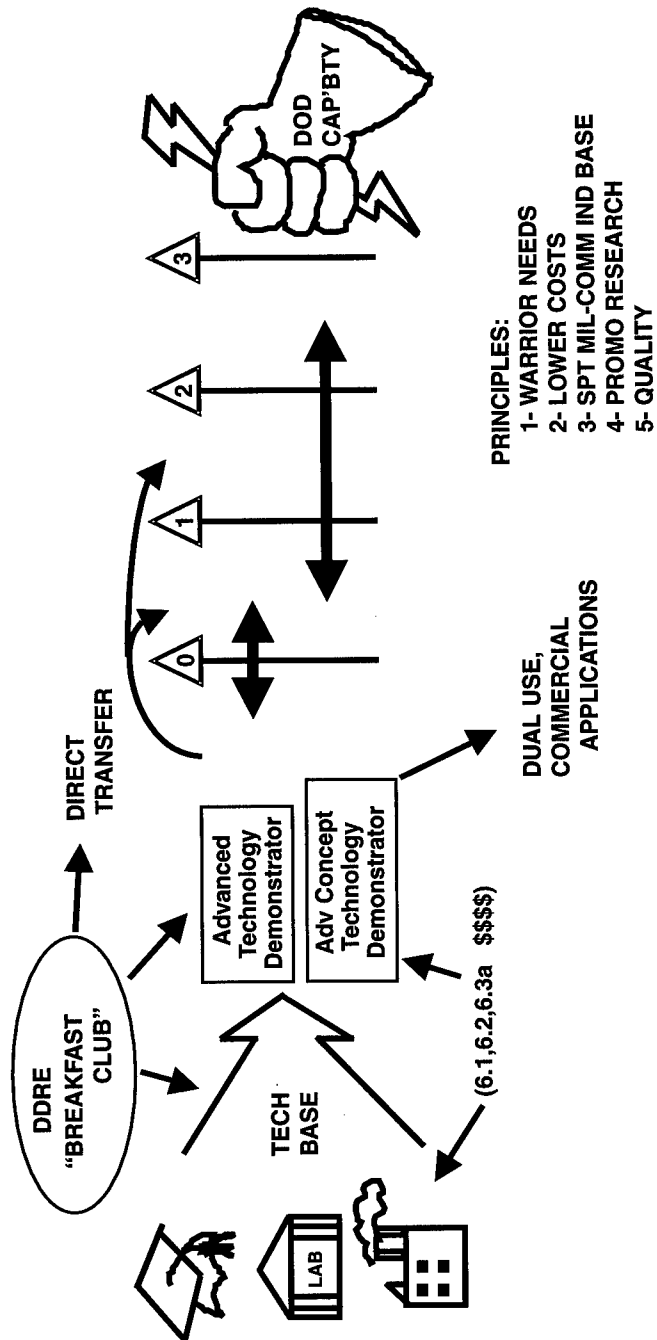
- Allocate Functions
  - Decompose Higher Functions
  - Allocate Performance
  - From Higher to Lower Functions
- Functional Descriptions
  - Functional Flow Block Diagrams
  - Time Line Analysis
  - Functional Architecture

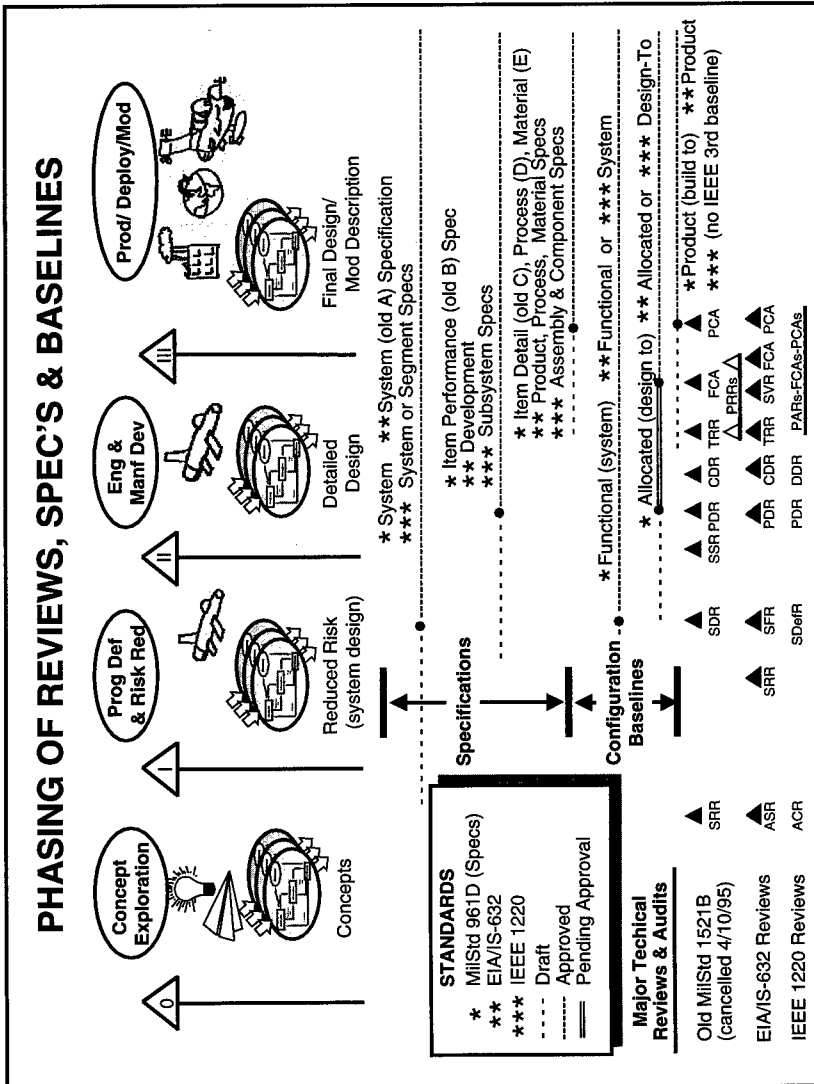


## SYSTEMS ANALYSIS AND CONTROL (MGMT TOOLS)



# New Science & Technology (S&T) Strategy





DSMC PROGRAM MANAGERS TOOL KIT

**SPECIFICATIONS AND STANDARDS**

A New Way of Doing Business (Acquisition Reform)  
(Sec Def Memo of 29 June 1994)

1. Use **Performance**-Based Specifications
2. Cancel/**Convert** Manufacturing and Management Standards to **Performance** or Nongovernment Standards (NGSs)
3. Encourage Contractors to Submit **Alternative Solutions** to Military Standards/Specifications
4. **Prohibit** Use of Military or commercial Specifications/Standards in Contract **Except** when **Authorized** by SAE or Designee

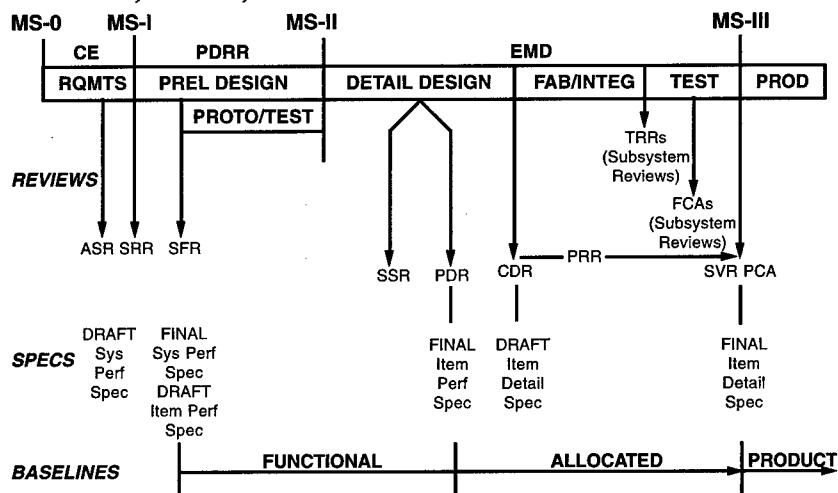
## DSMC PROGRAM MANAGERS TOOL KIT

### SPECS, REVIEWS, AUDITS & CM

#### SPECIFICATIONS

TYPE	WHEN	APPR	BASELINE
System	PDRR	SFR	Functional
Item Perf	PDRR	PDR (HW) SSR (S/W)	Allocated
Item Detail	EMD	PCA	Product
Process	EMD	PCA	Product
Material	EMD	PCA	Product

#### REVIEWS, SPECS, BASELINES AND AUDITS



#### SYSTEM REVIEW DEFINITIONS (Based on EIA Interim Std (IS) 632)

- ASR - Alternative Systems Review - Preferred System Solution meets needs
- SRR - Systems Requirements Review - Preliminary functional requirements
- SFR - Systems Functional Review - Approve functional requirements  
- Preliminary allocated requirements reviewed
- SSR - Software Specification Review - Approve S/W allocated requirements  
- Establish S/W allocated baseline

Note: EIA Interim Std (IS) 632 deletes use of "A", "B", "C", "D", and "E" designators



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DSMC PROGRAM MANAGERS TOOL KIT

**SPECS, REVIEWS, AUDITS & CM**  
(Continued)

**DEFINITIONS** (Continued)

PDR - Preliminary Design Review	- Approve H/W allocated requirements - Establish H/W allocated baselines
CDR - Critical Design Review	- Preliminary product requirements - Ready for fabrication
PRR - Production Readiness Review	- Assess producibility/manuf. readiness - Assess test readiness
TRR - Test Readiness Reviews	- Approve test plans
FCA - Functional Configuration Audits	- Verify CIs perform to spec
SVR - System Verification Review	- Verify CIs perform as "system"
PCA - Physical Configuration Audit	- Verify CIs "as built" documentation

---

**CONFIGURATION MANAGEMENT**

Four functions:

1. Configuration Identification - family of specs and drawings that describes the system or configuration item (CI)
2. Configuration Control - management of changes to a CI via the configuration control board (CCB)
3. Configuration Status Accounting - management information system that provides traceability of configuration ID and changes thereto
4. Configuration Audits - validate development requirements are achieved and tech documentation is complete and accurate

*Engineering change* - alteration in the approved configuration ID of a CI

Two types - Class I: proposed change affecting established CI baselines, supportability, interoperability or contractual factors.

- Class II: All other engineering changes

## DSMC PROGRAM MANAGERS TOOL KIT

### SOFTWARE MANAGEMENT

- Nine Principle Best Practices to Improve Software Development, Reduce Costs, and Increase User Satisfaction\*

- Formal Risk Management
- Agreement Interfaces
- Peer Reviews/Inspections/Walk-throughs
- Metric-Based Scheduling and Management
- Binary Quality Gate, at Inch-Pebble Level
- Program-wide Visibility of Project Progress vs. Plan
- Defect Tracking Against Quality Targets
- Configuration Management
- People-Aware Management Accountability

- Nine Project "Breathalyzer" Questions to provide "Quick Look" at Software Project Health\*\*

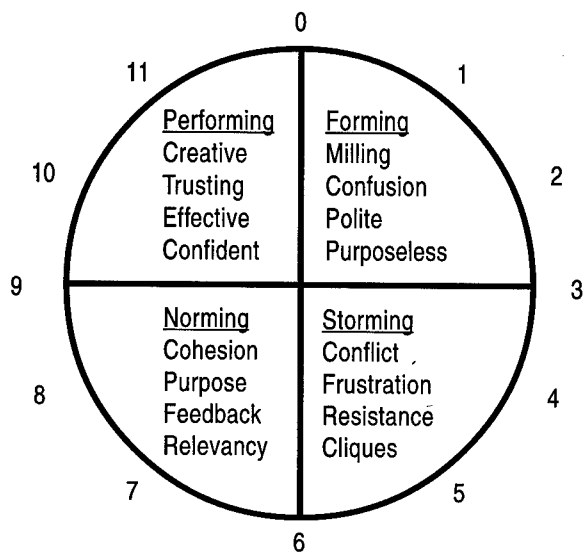
- Do you have a current, credible activity network supported by a work breakdown structure (WBS)?
- Do you have a current, credible schedule and budget?
- Do you know what software you are responsible for delivering?
- Can you list the current top 10 project risks?
- Do you know your schedule compression percentage?
- What is the estimated size of your software deliverable? How was it derived?
- Do you know the percentage of external interfaces that are not under your control?
- Does your staff have sufficient expertise in the project domains?
- Have you identified adequate staff to allocate to the scheduled tasks at the right time?

\*"Little Yellow Book of Software Management Questions" (Software Program Managers Network)

\*\*"Project Breathalyzer Questionnaire Software Health"; Software Program Managers Council

## WORKING GROUPS

### TEAM DEVELOPMENT WHEEL



RECOGNIZE WHICH PHASE OF  
TEAM DEVELOPMENT YOU ARE  
IN AND TAKE POSITIVE ACTION  
TO WORK THROUGH

### TYPICAL WORKING GROUPS

- Logistics Support Management Team (LSMT)
- Test & Evaluation Working Group (TEWG)
- Computer Resources Working Group (CRWG)
- Requirement Interface Working Group
- Interface Control Working Group (ICWG)
- Technology Assessment Working Group
- "Tiger" Team
- Process Action Team
- Integrated Product & Process Teams

## **WORKING GROUPS**

**(Continued)**

*Group Consensus* - all group members must accept a solution and live with the consequences. Until you have this agreement, you don't have consensus. Guidelines for achieving:

1. Avoid arguing for your own opinion.
  2. Go for "win-win" solutions.
  3. Do not change mind to avoid conflict.
  4. Avoid majority vote, coin-flipping, horse-trading.
  5. Expect differences of opinion.
- 

## **MANAGEMENT TRADE-OFFS FOR WORKING GROUPS**

### ***Advantages***

- More ideas & solutions
- Consensus positions
- Strong commitments

### ***Disadvantages***

- Takes more time
- Hard to terminate
- Paralysis by analysis

DSMC PROGRAM MANAGERS TOOL KIT

**NOTES**

## // LEADERSHIP & MANAGERIAL SKILLS

- More things that make you go “Hmmm?...”

“An authority is a person who just happens to know the source.”

“A conservative is a person who believes nothing should be done the first time.”

“Diplomacy is the art of hearing all parties arguing in a dispute and nodding to all of them without ever agreeing with any of them.”

“The meeting raised our confidence that the contractor can actually accomplish the task and that it will occur in our lifetime.”

“This is the earliest I've been late.”

“The world would be a much better place if people weren't allowed to have children until they've proven they can successfully manage a DoD program.”

“Leadership problems account for 80% of all acquisition problems.”

## DSMC PROGRAM MANAGERS TOOL KIT

### DELEGATION

#### **REASONS FOR DELEGATING**

1. Improve manager's time management
    - a. Increase manager's span of control
    - b. Increase time allocated to long range planning
    - c. Increased management efficiency
  2. Assure tasks performed by most qualified
  3. Build organizational depth
  4. Improve employee motivation
  5. Increased teamwork (IPTs/TQM)
  6. Maximize resources
  7. Appropriate organizational responsibility
- 

#### **12 STEPS FOR DELEGATING**

1. Set clear objectives and task statements
  2. Select "Delegate"; check qualifications
  3. Provide training, if necessary
  4. Solicit input from Delegate
  5. Assign task and deadline
  6. Provide any relevant guidance
    - a. Critical information required to do tasks right
    - b. Potential approaches - only as suggestions!
    - c. Describe results desired
  7. Makes a delegation "contract" (see next page)
  8. Establish controls
  9. Maintain controls
  10. Provide feedback
  11. Identify lessons learned
  12. Evaluate performance
- 

#### **DELEGATION STATUS FILE**

3 File Sections to hold all delegation records

- I. Current Month
  - Sectioned for 31 calendar days
  - File delegation records by suspense month
- II. Remaining 11 months
  - Section for each month
  - File delegation records by suspense month
- III. Completed Records
  - File alphabetically by Delegate name
  - Use data for performance evaluations

DSMC PROGRAM MANAGERS TOOL KIT

**DELEGATION**  
(Continued)

DELEGATION RECORD	
Description of Action:	Date:
Person Assigned:	
<i>Authority Level (specify):</i> 1 - Take action; do not report back 2 - Take action; report back (see Frequency) 3 - Prepare plan; proceed upon approval 4 - Do only as directed below	<i>Frequency of Contact (specify):</i> 1 - daily 2 - weekly 3 - monthly 4 - other _____
Delegation Guidance/Agreements:	
Suspense Action:	Suspense Date:
Performance Assessment:	



## **EFFECTIVE MEETINGS**

### ***PRE-MEETING***

- A. Establish type of meeting
  - 1. Information (quick, crisp)
  - 2. Planning/Strategizing (slow, deliberate)
  - 3. Problem solving (divergent/convergent)
  - 4. Decision (deliberate)
  - 5. Staff/Conference (repetitive, short)
  - 6. Feedback/Evaluation (slow, contemplative)
  - 7. Training (smooth, flowing)
  - 8. Social (rambling)
- B. Select participants
  - 1. Based on purpose; relevant; decision auth.
  - 2. Size: 4-7 ideal; 10-12 tolerable; >13 unsat.
- C. Circulate agenda (3-5 days in advance)
  - 1. Type, purpose, date, place, start/finish times
  - 2. Topics, time allocated (minutes), speakers
  - 3. Assign recorder

### ***CONDUCTING MEETING***

- A. Opening
  - 1. Start on time
  - 2. Repeat type and purpose of meeting
- B. During
  - 1. Facilitate the meeting
  - 2. Encourage openness and communication
  - 3. Develop cohesion
  - 4. Use active listening
  - 5. Stick to agenda
- C. Closing
  - 1. Set time and date of next meeting
  - 2. Summarize agreements, actions, decisions
  - 3. Close on time or before

### ***AFTER MEETING***

- A. Review minutes with recorder
- B. Publish minutes

## TOTAL QUALITY MANAGEMENT

*Quality:* consistent conformance to customer expectations

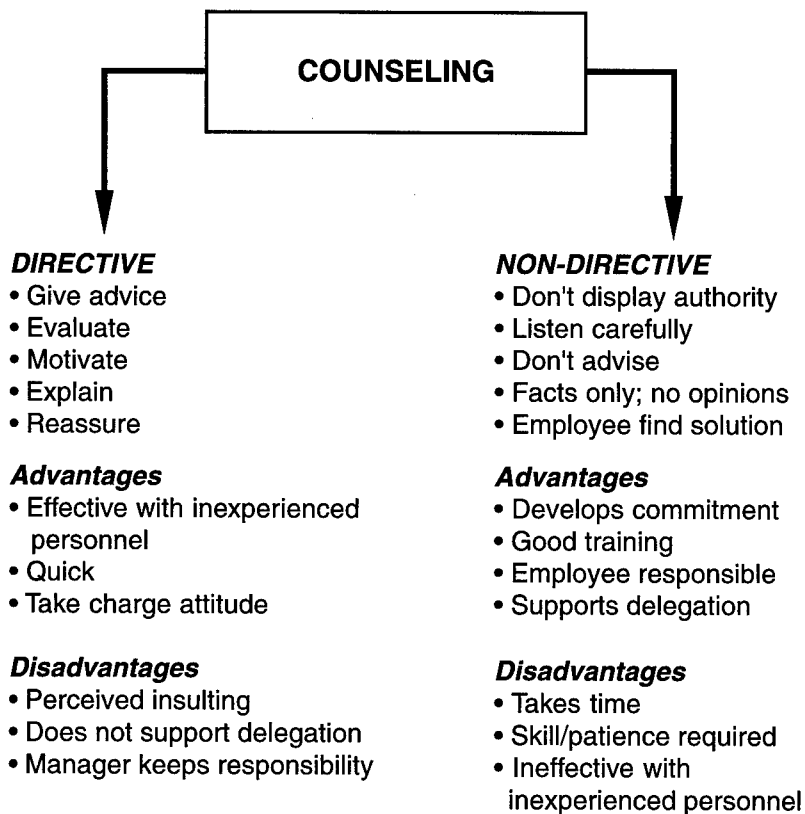
### *Seven Elements of Total Quality*

1. Customer Focus - who they are and what they expect
  2. Systems Perspective - the org. is a system with technical and social aspects
  3. Process Management - understand processes to provide needs of the customer
  4. Continuous Improvement - if it ain't perfect yet, improve it!
  5. Individual Involvement - people who do and understand work must be involved
  6. Teamwork - coordination of effort to produce timely, quality product
  7. Leadership Commitment - leaders at all levels focused on total quality
- 

### *Deming's Fourteen Obligations of Top Management*

1. Create constancy of purpose for improvement of product and service.
2. Adopt the new philosophy.
3. Cease dependence on inspection to achieve quality.
4. End the practice of awarding business on the basis of price tag alone. Instead, minimize total cost by working with a single supplier.
5. Improve constantly and forever every process for planning, production, and service.
6. Institute training on the job.
7. Adopt and institute leadership.
8. Drive out fear.
9. Break down barriers between staff areas.
10. Eliminate slogans, exhortations, and targets for the work force.
11. Eliminate numerical quotas for the work force and numerical goals of management.
12. Remove barriers that rob people of pride of workmanship. Eliminate the annual rating or merit system.
13. Institute a vigorous program of education and self-improvement for everyone.
14. Put everybody in the company to work to accomplish the transformation.

## PERSONAL COMMUNICATIONS



### ***COUNSELING PROCESS***

1. Set up interview - private, confidential, unhurried
2. Encourage discussion - open questions, active listening
3. Help employee think it through - deal with facts, no opinions or own views
4. Let them find the solution - *their* solution to *their* problem

**PERSONAL COMMUNICATIONS**  
(Continued)

***WIN-WIN NEGOTIATIONS***

FOCUS: Defeat the problem; not the person

APPROACH:

- Resolve conflict
- Reach agreement
- Normalize relationships
- Combine efforts

GOAL:

Acceptable gains by both parties

***INTER-PERSONAL NEGOTIATIONS***

1. Separate people and emotions from the problem
2. Focus on interests, not positions
3. Generate options for mutual gain
4. Insist on objective criteria

## PROBLEM SOLVING

### *CREATIVE PROBLEM SOLVING*

1. List perceived problems
2. Gather relevant data
3. Define actual problem
4. Determine alternative solutions
5. Analyze and evaluate alternatives
6. Select solution
7. Validate solution

### *DIVERGENT THINKING\**

1. Accept all ideas and alternatives
2. Defer judgement or evaluation
3. Discuss, combine, hitchhike, improve ideas
4. When exhausted, move to converge

### *CONVERGENT THINKING\**

1. Establish categories of alternatives
2. Develop evaluation criteria
3. Avoid premature closure
4. Keep eye on objective
5. List strengths and weaknesses
6. Select best alternative or idea

\*Used sequentially during all problem-solving steps

DSMC PROGRAM MANAGERS TOOL KIT

**PROBLEM SOLVING**  
(Continued)

**QUALITATIVE PROBLEM SOLVING**  
(Kepner - Tregoe)<sup>1/</sup>

Deviation Statement: (Describe the actual performance vs should performance)

	Is	Is Not	What is distinctive about "Is" vs "Is Not"?	Does the distinction suggest a change?
Specifying Question				
What? (Identify)				
Where? (Location)				
When? (Timing)				
Extent? (Magnitude)				
Possible Causes:				
Most Likely Cause:				

1. Define deviation.
2. Describe what deviation IS and IS NOT.
3. List distinctions between what deviation IS and IS NOT.
4. Do distinctions indicate or suggest a change?
5. Determine possible causes based on distinctions and changes.

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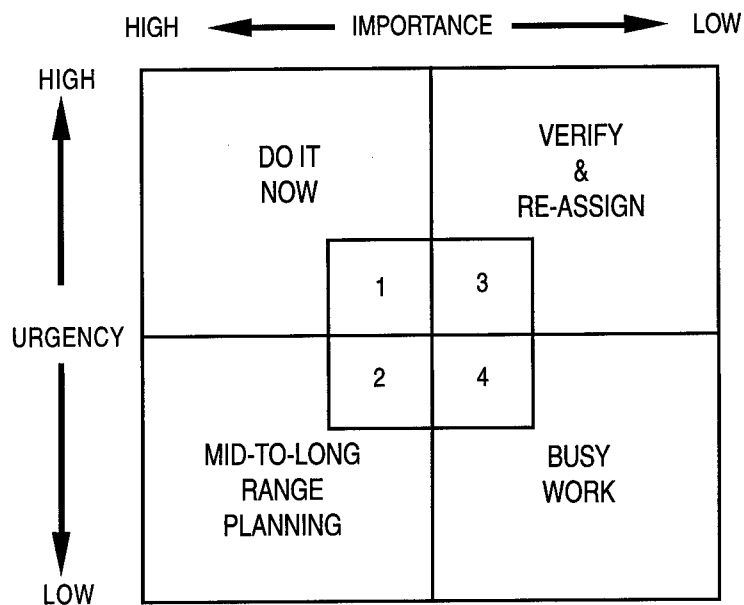
## TIME MANAGEMENT

### TIME ROBBERS AND AVOIDANCE TECHNIQUES



- |                              |  |
|------------------------------|--|
| 1. Incoming telephone calls  | <ul style="list-style-type: none"><li>- screen for importance</li><li>- limit to 2 minutes</li></ul>                                   |
| 2. Outgoing telephone calls  | <ul style="list-style-type: none"><li>- do all at one time</li><li>- itemize topics before calling</li><li>- don't socialize</li></ul> |
| 3. Unscheduled visitors      | <ul style="list-style-type: none"><li>- screen for importance</li><li>- do not invite into office</li><li>- remain standing</li></ul>  |
| 4. Improper delegation       | <ul style="list-style-type: none"><li>- re-delegate</li></ul>  |
| 5. Poorly conducted meetings | <ul style="list-style-type: none"><li>- stay focused on subject area and on schedule</li></ul>   |

# **TIME MANAGEMENT** (Continued)



1. List all tasks.
2. Categorize tasks using matrix.
3. Review quadrant 3 items; re-assign as 1, 2, or 4 as appropriate.
4. Do quadrant 1 tasks first; consider delegating!
5. Strive to maximize time for quadrant 2 tasks (be proactive!).
6. When all 1 and 2 tasks are complete, do quadrant 4 tasks.

## **KEEP A "TO DO" LIST**

1. List all goals and tasks.
2. Categorize as   A - High value  
                      B - Medium value  
                      C - Low value
3. Prioritize within each category (e.g. A-1, A-2, etc.).
4. Accomplish all A tasks, then all B. Do C if time permits.
5. Review list and priorities daily.



## BRAINSTORMING

**PURPOSE:** To stimulate the free flow of ideas.

**METHOD:** Group members take turns generating ideas. One idea stimulates another and then another. Freewheeling of ideas is encouraged. Brainstorming stops when all group members run out of ideas. See the back of this page for questions that may suggest new ideas for you.

### **GROUND RULES:**

Put judgment aside. Remember, all ideas can be thought of as starters.

*No criticism allowed.* This is not the time to judge an idea. Don't criticize other ideas no matter how ridiculous they may seem. The ideas can be discussed in detail later; now, the objective is to generate more ideas.

*Welcome free-wheeling or blue-skying.* Let those wild ideas come out—otherwise you may conceal your creative process. The impractical ideas may trigger other ideas that are possible to use.

*Strive for quantity, not quality.* The more ideas brought out, the better the chance of a great solution.

*Combine and rearrange ideas.* Single ideas aren't the only way to make a suggestion. You can make additions or combinations of previously suggested ideas to create still better ideas.

*Record all ideas exactly as expressed.* This keeps the mind free of remembering what was said and allows you to build on previous ideas.

## **BRAINSTORMING**

**(Continued)**

### ***Why does it work?***

Some of the reasons why brainstorming enhances a group's creativity are that it:

- Increases involvement and participation.
- Produces the most ideas in the shortest time.
- Reduces the need to give the "right" answer.
- Frees up the group; allows the members to have fun and is interesting.
- Reduces the possibility of negative thinking.

### **QUESTIONS TO STIMULATE YOUR BRAIN CELLS:**

1. Can we use this idea elsewhere? As is? With changes?
2. If we change it,; Is there anything else like it? Any related issues?
3. Modify? Change? Rearrange? Meaning, color, motion, sound, odor, taste, form, shape, layout, etc.?
4. Magnify? Add what? More, stronger, larger, new?
5. Minimize? Subtract what? Eliminate, smaller, lighter, slower, split?
6. Substitute? Who, what, when, where?
7. Reverse? Opposite, backwards, upside down, inside out?

## DECISION BRIEFING

### *Elements of a Decision Briefing*

- Purpose - Issues
- Outline - Agenda
- Background
- Assumptions
- Alternatives Identified
- Evaluation Criteria
- Analysis of Alternatives
- Recommendation
- Implementation Plan

### *Things to Expect (from Briefee)*

- Challenges to assumptions, definitions, methodology
- Does it comply with or change policy?
- Is the situation sensitive to change?
- Issues with analysis, tradeoffs, recommendations, implementation
- Open/closed questions

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NOTES

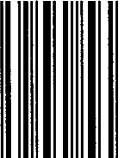
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